

Assessment of Mechanisms for Increasing Financial Resources for Sustainable Forest Management

Report submitted to Natural Resources Canada,
The Canadian Forest Service, International Affairs

L. Vertinsky, J.D., Ph.D.
I. Vertinsky, Ph.D.

This document is not an official publication of the Government of Canada
and the views and opinions expressed in it are those of the authors
and not necessarily those of the Government of Canada

October 1998

Acknowledgement

We are grateful for information and insightful comments received from

M. Fullerton
D. Drake
T. Ursacki
T. Lemprière
M. Apsey
D. Boulter
J. Catimel
J. Hardie
L. Keller
M. Levi
R. McConnell
C. Parker
R. Roberts
D. Rousseau
M. Sarnat
N. Smyth
C. vanKooten

Responsibility for errors and opinions is the authors' alone.

Executive Summary

The Problem and the Challenge

One of the major challenges facing the world is the diminishing quantity and quality of forest assets. Most of the losses are in developing countries. These losses may have irreversible long term impacts. While demand for forest goods and services is increasing (as is awareness of the importance of "global public goods" produced by forests), their supply is becoming less secure. The loss of forests may also have some important economic consequences since two percent of global gross domestic product depends on forests.

The threats to the sustainability of the forest stem from both market and policy failures in the developed and developing countries and the transition economies. Market failures result from a variety of causes. These include: externalities, high risk, incomplete information, lack of appropriate legal infrastructure to define property rights and facilitate market transactions, and distortionary subsidies in and outside of the forest sector.

Meeting the challenge of restoring forest management to a sustainable development path requires first correcting policy failures and ensuring that socially desirable levels of investment in SFM are achieved. Because the costs and benefits of investments in SFM are not evenly distributed, achieving international agreement may require transfers of resources within regions and between the North and South. The estimates of how much is needed are imprecise but it is clear that a very large sum is necessary to meet SFM objectives in developing countries.

The correction of market and policy failures in the South is constrained not only by the availability of financial resources but also by the lack of capacity for sustainable forest management. The SFM capacity is constrained by insufficient institutional development, the scarcity of appropriately skilled human capital, inadequate access to technologies and inability to adopt innovative technologies to local conditions and under-developed civil society.

Governance Systems

The effectiveness and sometimes the feasibility of alternative mechanisms and strategies to achieve SFM and to raise resources for it depend on the general system of governance in which they are embedded.

We consider five stylized international forest governance systems which are distinguished by differing legal arrangements, institutions, membership, and linkages to broader governance systems and political leadership:

- i) the status quo (the current regime);
- ii) a system where leadership is provided by an international council of forestry ministers of forest-rich countries;
- iii) a system with a formal central forestry organization under the UN umbrella;
- iv) a system in which forest protocols are added to existing conventions (e.g., the Convention on Bio-Diversity (CBD) and the Framework Convention on Climate Change (FCCC)); and
- v) a system with a legally binding forest convention.

Clearly, a system may involve hybridization of features from other systems.

Choice of a governance system affects the ease with which a particular mechanism or strategy to fund or promote SFM is agreed upon, its political and economic feasibility, its costs of implementation and operations, and its sustainability and impact. There are antecedent conditions which may change the impact of the governance system on alternative mechanisms. These include: (1) the degree of public awareness and understanding of forest issues; (2) the mobilisation of international NGOs to deal with forest issues; (3) priorities of forest issues in the international political agenda; and (4) the empowerment of constituencies living in the forests.

The larger the number of parties involved in a particular governance system and the greater the heterogeneity of interests, the greater the difficulty in agreeing on a mechanism and implementing it, unless immediate visible benefits to the implementer can be demonstrated. The greater the degree of change from the status quo, the stronger will be the resistance to the change. The higher the degree of legal commitment, the higher the likelihood of implementing

stable funding mechanisms. The more institutionalized the governance system is, the higher the predictability of system responses and the more implementation capabilities it will have.

Strategies to Fund SFM in the South

Correcting market and policy failures and rehabilitating forest degradation in the South will confer important local and global benefits. These activities, however, require some funding. Below we explore alternative mechanisms for funding SFM in the South (many apply also to the North countries). There are three classes of strategies to secure funding for SFM in the South:

- (1) strategies that involve no new money for forests;
- (2) strategies to raise new money for SFM in the public sector;
- (3) strategies to raise new money for SFM in the private sector.

The first class of strategies recognizes that the aid pie is not likely to increase significantly in the near future and that public sector financing in the South is limited. Increases in the effectiveness of existing aid mechanisms, on the one hand, and the promotion of SFM through the articulation of international obligations and/or domestic regulatory reforms, on the other, characterize the specific mechanisms in this class.

The second class of strategies recognizes that the existence of global public goods and services which are derived from the forest justifies demands from the developed countries for "new money on the table" for SFM rather than just redeployment of aid funds from existing uses to the promotion of SFM. Furthermore, to implement comprehensive national forest action plans in the South, new domestic resources must also be mobilised to supplement external funding.

The public sector funding strategies discussed in this report include earmarked domestic and international taxes and user fees, concessionary loans, elimination of distortionary subsidies, and innovative mechanisms such as the sale of tradable permits and carbon offsets. Some of these measures (e.g., environmental taxes) may have a double impact, generating revenues for SFM while directly correcting market failures that distort forest management.

The tremendous growth in foreign direct investment flows to the South in recent years, which dwarf flows of foreign aid, offers perhaps the most important potential source of new monies for SFM in the South.

Use of FDI involves allocation of resources through the market, a process which is likely to increase the effectiveness of spending on SFM. Barriers and market failures must be corrected to promote investments in the forest products sector. However, mechanisms to ensure that new investments are channeled only to sustainable forestry investments must also be in place. These may include private sector "demand" related actions. Involving private sector customers and consumers in encouraging SFM through market premia and/or market access constraints, requires the development of differentiated markets or marketing channels (e.g., buyer clubs committed to purchase only certified wood). This, however, may threaten free trade in forest products which is important to resolve undervaluation of forest resources and promote efficient allocation of resources. Furthermore, without clearly articulated scientifically base principles of SFM, it is not clear that any particular certification process designed to differentiate forest products will indeed promote SFM. The development of new financial mechanisms to raise funds for SFM (e.g. SFM venture funds) may provide other avenues for private sector participation through portfolio investments. In societies where post-material values are emerging, avenues for charitable contributions to SFM also provide an important role for private sector promotion of the public interest.

One must recognise the fact that any money spent on SFM has an opportunity cost. Furthermore, raising funds may involve high transaction costs and introduce costly distortion to the economy. While from an efficiency point of view the evaluation of SFM programs may be based on cost-benefit analysis, significant redeployment of funds also has international and domestic impacts on wealth distribution which must be considered.

Evaluation of Mechanisms and Conclusion

Our analysis suggests that an important potential source for new money for forests in the South could result from the Clean Development Mechanism in the FCCC. The sale of carbon offsets (i.e. exchanging obligations to reduce emission of greenhouse gases for afforestation or reforestation investment in the South) can result in a large flow of funds for forests in the South. This is an excellent example of internalization of global public goods by businesses. The amount may be large depending on the degree to which the Kyoto Protocol is implemented. This win-win situation should create little resistance except perhaps from environmental NGOs who may see offset sales as a means for legitimizing environmental degradation. Forest rich countries in the North may worry about shifts in competitive advantage to the South and the potential of oversupply of forest products. International eco-taxes are very attractive conceptually but are unlikely to be adopted as internationally earmarked taxes. Indeed, while many countries have imposed gasoline and energy taxes, few are likely to give up their lucrative revenues or add to their citizens' tax burden. The earmarking of forest-based taxes is more likely to be accepted internationally, but is likely to be resisted by both forest-rich countries and those with high demands for forest products, as they will carry a larger share of the tax burden (a low rate consumption tax may be, however, the exception). Tobin taxes may raise a large amount of revenue, but the decision of how to use the revenues is a political one. Given the current low priority of forests (compared, say, to debt forgiveness) it is unlikely that this or other taxes will be directed to SFM. International taxation requires a framework that ensures compliance and prevents avoidance and free riding. This can only be obtained, in a less than utopian world, with a legally-binding system offered by a forest sector convention (or at least legally-binding forest protocols to other conventions). Collection of international taxes should be left to national

governments to reduce threats to sovereignty and lower transaction costs. The major industrialized countries must join the scheme and commit to earmarking. The chance of agreement will not be large since different countries will be bearing different shares of the taxes depending on their economic structure, resource utilization profiles and the nature of the tax. For example, countries with energy-intensive industries are less likely to accept energy taxes since they may hurt their competitiveness (at least in the short run, which often is all that matters in political decision-making). Generally tax burdens in the industrialized world are considered high and selling to the public measures which are not revenue neutral will be difficult.

From a political point of view, earmarking is likely to be more acceptable if taxes are imposed on the sector to which the taxes are earmarked (this is true also when dealing with domestic taxes). This suggests that only taxes imposed on the forest sector are likely to be earmarked to forestry. While from a theoretical point of view there is no justification to finance SFM in the South by taxing only forest-related activities (unless such taxation is to correct market failures in the sector) from a pragmatic point of view a tax on consumption with a rate low enough to avoid any market distortion (i.e., prevent substitution effects) may be acceptable. The problem is that such a tax may not raise significant funds.

Elimination of distortionary subsidies is a measure which would be praised by every economist, but resisted fiercely by those receiving the subsidies. Diffuse benefits in the future and concentrated costs in the present are not a good combination for sound politics. Furthermore it is not likely that any savings gained could be easily diverted to supporting foreign aid in general and SFM in particular. Again legally binding obligations under a convention may provide the moral authority for governments that wish to correct the market distortion of inappropriate subsidies to resist rent-seekers who want to maintain them. It is not very likely,

however, that governments will accept legally binding obligations to reform their domestic regulations. It is more likely that they will accept such obligations as a "soft law".

Voluntary certification schemes and eco-group actions require little official acceptance. Their influence is growing. There is, however, a confusion that stems from proliferation of uncoordinated and sometimes conflicting activities and lack of scientific validation of claims underlying these actions. The uncertainty this creates depresses the value of resources (and thus may lead to conversion of land from forestry to other uses). A convention can do much to alleviate uncertainty by encouraging the development of an agreed-upon definition of SFM and criteria and indicators to monitor progress toward SFM. A convention may also ensure free trade in forest products and contribute to the role FDI may play in funding SFM in the South. A forest governance system led by a Council of Forest Ministers is also likely to provide strong support for the maintenance of free trade in forest products and contribute to the resolution of undervaluation of forest resources.

Channelling FDI to SFM offers a good potential source of funds, especially if financial resources are available to correct market failures. General measures to promote FDI in the South are being implemented and despite the recent monetary crises the long-term trend will see an increase in FDI to the South. A forest convention which sets international standards of performance is likely to reduce myopic flows of investment that reduce sustainability and increase the share of FDI with a long-term view that contributes to sustainable forest management. A governance system with a strong lead central forestry organization could provide an alternative to a patchwork of voluntary monitoring SFM evaluation schemes. The activities of such an organization may be further enhanced by the existence of a binding forest

convention which will confer legitimacy on its operations and provide agreed-upon definitions for its assessments.

Private monetary measures and charitable activities are important but are not likely to generate significant amounts of capital for SFM in developing countries.

Strategies that involve no new money are attractive and are synergetic with all other mechanisms. Increasing international co-ordination of aid will involve at a minimum the largest donors and aid recipients and the major multilateral aid organizations. There is broad acceptance that co-ordination must improve. The transaction costs of measures such as opening "country" offices to co-ordinate aid projects would not be large. Coordination would improve under a governance system which involves a central international forest organization. Such an organization would facilitate data sharing and help develop common impact indicators and cut down duplication. Pooling of resources from bilateral programs into central multilateral programs may help gain economies of scale and scope. Generally there will be less overt resistance to increased coordination, though some major donors may want to keep a measure of autonomy for their programs to preserve their national identity (thus resisting pooling of funds) and obtain maximum economic and political benefits from their delivery. Improved coordination is likely to increase the sensitivity of programs to the priorities of the recipients if such priorities are well articulated (one would expect a higher degree of sensitivity in meeting priorities of the more sophisticated developing countries and countries in transition).

A key element in coordination which is likely to increase the sensitivity of aid to the priorities of recipients is the development of a National Forest Action Plan (NFAP) for each recipient. The development of NFAPs requires, however, technical assistance which could be coordinated by an international forest organization. Under the status quo governance system

only slow progress is being made in developing NFAPs for many developing countries. Resistance to the development of NFAPs may emerge from countries which lack technical resources and are unable to develop the necessary data bases and information systems. The provision of external financial support and technology transfer in such circumstances will facilitate implementation. The combination of the above measures provides critical infrastructure to ensure significant improvements in the efficiency of aid. NFAPs will reduce the uncertainty involved in private sector investment in SFM. While NFAPs may reduce some investments (those which do not contribute to sustainability and therefore do not fit within the NFAP) they may increase the contribution of other investments to SFM. A forest convention will facilitate the generation of NFAPs and international co-ordination by providing a framework for international harmonization of objectives and definitions and articulating the legally binding duties of countries with respect to managing their forests.

Measures to improve accountability are typically supported by donors and resisted by some recipients who may see such measures as infringements on their sovereignty. Measures which incorporate relevant globally agreed-to performance measures or performance measures negotiated with recipients are less likely to be resisted than measures which are highly prescriptive as to means, measures that are imposed unilaterally or measures containing conditions which reflect donor objectives that are not directly relevant to SFM. Well designed performance-based measures are likely to increase efficiency and involve low transaction costs. Complex mechanisms to increase accountability (reflecting donor administrative cultures) may meet resistance from recipients, involve high transaction costs, and contribute little to performance. Such measures may show little sensitivity to the priorities or conditions of the recipient countries.

The development of scientifically-based industry guidelines or codes for SFM is likely to contribute to the promotion of SFM. Such codes and guidelines should allow appropriate scope for incorporating the priorities of different countries and their stakeholders as well as reflecting the variety of economic, social and forest conditions. Resistance to such codes will be inversely related to their "softness". Legally binding codes are likely to be resisted by some developed countries and many developing countries who may see them as new forms of Western imperialism. The development of such codes and guidelines must be evolutionary and can be facilitated by leadership of a Council of Forest Ministers (a smaller, more homogenous group where consensus is easier to achieve) and implementation through a centralized international forestry organization. The provision of a general framework and harmonization of definitions implicit in international codes or guidelines will reduce transaction costs and help achieve SFM. A convention may provide the appropriate forum (through the Conference of the Parties) for negotiating such codes. It is likely, however, that achieving consensus on legally binding international regulations will require dilution of these regulations more than if such consensus were being developed for a voluntary code.

Correcting policy failures through regulatory reform is a key to successful implementation of SFM in the South. We have already noted the need to eliminate distortionary subsidies and the political difficulties that such moves involve. Other policies that adversely affect the forests (e.g., non-sustainable industrialization policies, promotion of agriculture on cleared forest lands) also have beneficiaries who will object to any change which will reduce the benefits they accrue from the policy. Governments in the South must be encouraged to engage in reform, but clearly any reforms should remain as their own independent initiative (few governments are likely to cede control of their regulatory processes). Encouragement of

regulatory reform can be achieved through financial incentives and ODA conditionality. Support of NGOs committed to SFM may also reinforce the desired change process and the domestic mobilisation of financial resources, but care must be taken to ensure that such support is not perceived as meddling in the internal political arena of a country.

Building policy-making and implementation capacities as well as technological SFM capacities is an important pre-condition for an effective and lasting reform process. Reform processes in countries of the South may benefit from help provided by a well-endowed central forest agency capable of sharing expertise and information. Strong international leadership that can be provided by a Council of Forest Ministers may also prompt countries of the South to initiate reform processes.

Correcting market failure through regulatory reform and the use of economic instruments may reduce the future likelihood of policy failures. Competitive markets provide an efficient mechanism of resource allocation. They may fail, however, when externalities are present, information is incomplete, risks are high, property rights are blurred, infrastructure for their operation does not exist, or the power of some economic agents in the market allows them to influence the process.

Government, by providing the infrastructure, clarifying property rights, disseminating information, reducing risks and internalizing externalities through tax incentives or subsidies can, to an extent, correct market failures and ensure the flow of private resources to SFM.

Since investment in SFM involves most of the characteristics that lead to market failure with resulting underinvestment, governments should use economic instruments as well as regulatory reforms to correct this failure.

There are several problems in using economic instruments. There are technical problems. To internalize externalities it is necessary to estimate them accurately. Thus, for example, if the benefits of carbon sequestration are underestimated there will be less than optimal investment in afforestation. If, on the other hand, the damage of certain forest practices is overestimated the charges (fines) imposed may result in unjustified economic losses.

Politically, new taxes and changes are not very popular, while subsidies are expensive. Clarifying property rights may lead to conflict and objections from those excluded from the rights. So despite the fact that the use of economic instruments to correct market failure is desirable, it is often not the first choice of governments.

The use of debt-related mechanisms by donor countries to finance or promote SFM in the South is limited for several reasons: (1) the increasing efficiency of global capital markets is reducing the possibility of using debt market imperfections to expand the financial resources of countries of the South with the aid of donors; (2) heavily indebted countries may not be able or willing to carry a higher loan burden; (3) the use of debt forgiveness and conditionality may have many competing claims besides SFM.

The use of ODA and grants for SFM is limited. ODA resources are shrinking while claims are increasing. SFM claims lack at present the visibility and political support to gain a substantial new share of a shrinking pie. A governance system that can increase the priority of forests in international and domestic political agendas may help secure more funds for forests.

In conclusion, it is obvious that there are many mechanisms to fund and promote SFM in the South. It is clear that the particular political, economic and forest conditions of a country will influence the effectiveness of any mechanism that is chosen. Indeed, the choice should not be one of a single mechanism, but rather of an appropriate portfolio of mechanisms. The

correction of market and policy failures in the South, North and internationally are fundamental. Funds raised should be in support of and consistent with market and policy failure correction. The effectiveness of the various mechanisms depends on the governance system underlying forest management and the political support it can generate for forest issues.

1. The Problem

One of the major challenges facing the world is the diminishing quantity and quality of forest assets (Bass and Thompson, 1996). This problem is particularly acute in the developing countries. There are approximately 3,500 million hectares of forests (27% of the world's usable land). Fifty-seven percent of forest land is in developing countries (FAO, 1997). The average global rate of annual reduction in forest cover during 1990-1995 was 0.3%, representing a loss of 11,269,000 ha a year. Most of the losses are in developing countries (e.g., loss of 3,328,000 ha in South America, of which 2,554,000 ha are lost annually in Brazil). In Europe, the former USSR, the US, and Canada there were gains in forest cover of approximately 2 million ha a year (FAO, 1997; FAO, 1993; van Kooten, Sedjo and Bulte, 1999). The world has so far lost about 40% of its original forest area of 6,000 million hectares (CFAN 1998). These losses may have irreversible long term impacts. These include the threat of the loss of some 50% of the earth's plant and animal life; a significant reduction in the capacity of the forest to moderate the global climate; intensification of soil erosion; and increases in water shortages. While demand for forest goods and services is increasing (as is awareness of the importance of "global public goods" produced by forests), their supply is becoming less secure. The loss of forests may also have some important economic consequences since two percent of global gross domestic product depends on forests (CFAN, 1998). Forest production is about US\$400 billion and the international trade in wood products is over US\$100 billion (FAO, 1997). More importantly, the subsistence of 500 million people who live in or at the edge of the tropical forest is threatened. This may be especially burdensome on 150 million aboriginals (CFAN, 1998:12).

2. Roots of the Problem

The threats to the sustainability of the forest stem from both market and policy failures in the developed and developing countries and the transition economies. Market failures result from a variety of causes. These include: externalities, high risk, incomplete information, lack of appropriate legal infrastructure to define property rights and facilitate market transactions, and distortionary subsidies in and outside of the forest sector. "Few investments in the protection or in truly sustainable exploitation of natural forests, aquatic natural habitats and other rural resources are currently profitable from the individual country perspective and much fewer are privately profitable" (López, 1997:ii). Eco-tourism, genetic prospecting, and non-timber forest extraction are profitable only in special sites (Southgate, 1996; Southgate and Clark, 1993; López, 1997). It is only when the global forest externalities (i.e., carbon sequestration and biodiversity reserve) are taken into account that deforestation of natural forests becomes "bad business" (López, 1997:iii).

Ensuring environmental sustainability involves immediate costs, whereas the benefits often appear only in the long run. The South, where much of the investment to protect the forests must take place, may capture only a small portion of these global benefits. The motivation by countries of the South to take independent action is therefore weaker. Furthermore, the ability of the South to take action is limited by lack of capital. Financial markets would not sustain further loans to countries of the South burdened with heavy debt loads. Scarcity of technical expertise and know-how to sustainably manage forests and produce the necessary scientific research needed for sustainable forest management (SFM) also prevents the South from conserving its forests and managing them sustainably.

Lack of sufficient commitment to invest in SFM is not limited only to the South.

Globally forest resources are undervalued. The main causes for this are (CFAN, 1998:15):

- i) non-market goods and environmental services not entering national accounts, leading to lower priority in national agendas;
- ii) long rotations (compared to agriculture) and the existence of externalities lead to under-investment by private enterprises;
- iii) lack of sufficient enforcement of property rights in some natural forests;
- iv) lack of information about potential benefits of the forest and markets;
- v) the fact that especially in countries of the South forests provide subsistence to the rural poor, who are a disempowered group with no officially recorded economic impact (their consumption is not reflected in valuations of the forest).

Governments in countries of the South and North, as well as the transition economies, also bear responsibility for the unsustainable development path of forest resources. Policy and institutional failures include the following: (1) faulty development strategies within the forest (e.g., low stumpage, short-term tenure arrangements) and outside the forests (e.g., agricultural subsidies and other tax concessions and subsidies which encourage alternative land uses for forests, colonization schemes which lead to deforestation); (2) weak definition of property rights; (3) weak forest management institutions with low priority in public policy agendas and budgets; (4) institutional weakness stemming from general lack of proper governance (e.g., corruption, rent seeking) or lack of consensus about forest management among key stakeholders of the forest.

3. The Challenge

Meeting the challenge of restoring forest management to a sustainable development path requires correcting policy failures and ensuring that socially desirable levels of investment in SFM are achieved. Correcting market failures through regulatory reform and the employment of economic instruments may mobilize private sector resources to invest in SFM both in the North and the South. Since some of the externalities that exist are global, full internalization requires international agreement and commitment. Because the costs and benefits of investments in SFM are not evenly distributed, achieving international agreement may require transfers of resources. In particular, since significant investment to achieve global forest benefits is required in the South, which faces severe resource constraints, transfers of funds from the North to the South will be necessary. These funds might be considered to represent the fair share of the externalities the North receives from SFM in the South, and will serve to facilitate the South adopting more appropriate measures to correct policy and market failures by providing part of the investment that must be made to achieve SFM.

How much is needed in total to resolve these market failures, and how much should be transferred from the North?

- Chapter 11 of Agenda 21 suggests a target of US\$31.25 billion per year during the period 1993-2000, assuming that deforestation was contained at the level of 1992-93. At this level of expenditures the four programs of the chapter could be fully financed. International concessional financing requirements were estimated at US\$5.7 billion a year.
- The Pretoria IPF Inter-Sessional Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry suggested a target of US\$33.3 billion. To counter resource depletion from deforestation another US\$36 billion was suggested.

- High-income countries in the OECD have committed between one and three percent of their income over almost two decades to funding environmental improvement. There is concern that developing countries cannot bear costs on the same scale.

- López cites funding needs in Latin America for general sustainability to be over two percent of GDP, or about US\$25 billion. Adding Africa and Asia may triple the bill. If most is to be spent on the forest environment (since urban-industrial environmental protection can pay for itself) the figure for SFM could reach more than \$50 billion a year.

These estimates are imprecise but it is clear that a very large sum is necessary to meet SFM objectives in developing countries.

The correction of market and policy failures in the South is constrained not only by the availability of financial resources but also by the lack of capacity for sustainable forest management. The SFM capacity is constrained by insufficient institutional development, the scarcity of appropriately skilled human capital, inadequate access to technologies and inability to adopt innovative technologies to local conditions and under-developed civil society.

Internationally there is a need to remove international barriers to trade in forest products to increase the value of these products (especially in the South). There is also a need to remove barriers on investment flows and the transfer of technologies.

More generally, there is a need to develop global and national political support for SFM by increasing awareness of the global and national benefits of SFM. In this report we explore alternative mechanisms that meet some of these challenges (in a companion paper we explore the specific mechanisms and strategies to transfer SFM technologies to and stimulate SFM-related technological innovation in the South).

4. Governance Systems : Alternatives Under Which the Challenges Can be Met

The effectiveness and sometimes the feasibility of alternative mechanisms and strategies to achieve SFM and/or raise resources for it depend on the general system of governance in which they are embedded. A forest governance system determines in part the likelihood that a particular mechanism of financing will be chosen, the objectives that will be set for it, the ways it is likely to function, and the effectiveness with which it will achieve the objectives set for it and SFM objectives (which may be different from the objectives set for the mechanism).

"Governance is the sum of the many ways in which individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either agree to or perceive to be in their interest" (Commission on Global Governance, 1998:1).

We consider five stylized international forest governance systems which are distinguished by differing legal arrangements, institutions, membership, and linkages to broader governance systems:

- i) maintaining the status quo (the current regime);
- ii) establishing an international council of forestry ministers of forest-rich countries;
- iii) establishing a formal central forestry organization under the UN umbrella;
- iv) adding forest protocols to existing conventions (e.g., the Convention on Bio-Diversity (CBD) and the Framework Convention on Climate Change (FCCC)) and widening the mandates of existing multilateral financial facilities;
- v) a legally binding forest convention.

We shall describe each of the systems in terms of the special attributes that distinguish it from the others and that affect how different mechanisms are likely to operate within it. Clearly hybrid systems are possible (or even likely).

4.1 The Current System of International Forest Governance is Best Described as a Decentralized (some claimed fractionated) System in Treating the Forest

Several international conventions deal with a variety of aspects (mainly environmental) associated with the forest environment (e.g., biodiversity maintenance is dealt with by the Convention on Biodiversity - CBD) and the contributions the forest can make (e.g., carbon sequestration is dealt with by the Framework Convention on Climate Change - FCCC). These and other conventions and legal instruments¹ "form an interesting set of forest-dependent components, such as atmosphere, water/wetlands, threatened species, bio-diversity and deserts without identifying or dealing directly with the elephant - the forest itself" (Roberts and Nagle, 1997:4). The social and economic aspects of SFM receive inadequate attention. Financial assistance in support of these conventions is provided by the Global Environmental Facility. Support for these and other forest projects is also provided by the regional and global development banks, as well as uncoordinated bilateral aid programs of countries in support of SFM.

The system of global agreements is complemented by a variety of regional treaties with different degrees of breadth of coverage. For example, the African Convention on Conservation of Nature and Natural Resources intends to conserve, utilize and develop natural resources so as to maximize social welfare. In contrast the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere seeks to conserve wildlife through the designation of specially protected areas. The Central American Regional Convention is the first treaty to focus specifically on the conservation of forests (Tarasafsky, 1995).

¹ For example, the International Tropical Timber Agreement (ITTA) - a globally binding commodity treaty, the World Heritage Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Convention to Combat Desertification (CCD).

The Food and Agriculture Organization (FAO), the designated UN lead organization in forestry spends about 4% of its budget on forest-related activities. It is governed by agriculture ministers and thus reflects their priorities.

The importance of the forest has been recognized in the deliberations of UNCED. Two documents were focused entirely on forests: Chapter 11 of Agenda 21, entitled "Combating deforestation", and the "Non-legally binding authoritative statement of principles for a global consensus on management, conservation and sustainable development of all types of forests".

The debate on forests continued after UNCED and an intergovernmental forum focusing on some priority issues articulated in these debates was established by CSD, "the open-ended ad hoc Intergovernmental Panel on Forests" (IPF). The panel was charged with exploring issues associated with (1) the implementation of UNCED decisions related to forests; (2) international cooperation in financial assistance and technology transfer; (3) scientific research on forest assessment and the development of criteria and indicators for sustainable forest management; (4) environmental and trade-related measures concerning forest products and services; and (5) institutions and instruments for governance of forests.

Because the IPF could not reach an agreement, UNGASS decided in June 1997 to establish another dialogue process under the auspices of the Intergovernmental Forum on Forests (IFF). It has a two and a half year mandate and will report to the CSD in April 2000. It was mandated to: (1) facilitate and promote the implementation of the IPF proposals and monitor and report on progress; (2) consider matters left pending by the IPF; (3) build a consensus for international arrangements and mechanisms and identify elements of new arrangements including a possible forest convention.

The IPF and the IFF that succeeded it, have so far provided a very useful forum for intergovernmental dialogue. The IFF, however, like its predecessor, is also a temporary process and its dialogue is characterized by unbridged divides on South-North issues, and by differences among high forest cover and low forest cover countries. It receives relatively little attention from either the public or governments (Report on the International Expert Consultation, Baden-Baden 1998). An informal Inter-Agency Task Force on Forestry (ITFF) with representatives from FAO, UNDP, UNEP and others provides the administrative support for more continuous coordination of the dialogue among member institutions.

Forest issues are also discussed internationally through several inter-governmental processes pursuing definitions and measurements of national criteria and indicators to measure progress toward SFM (e.g., the Montreal, the Helsinki and the Tarapoto processes).

Generally there is a lack of clear global official leadership and coordination on forest issues. Forest issues do not receive sufficient priority in national and multilateral fora and budgetary processes.

The apparent "vacuum" has created opportunities for non-governmental bodies to advance ideas and attempt to influence the evolution of the "current" governance system. The World Commission on Forests and Sustainable Development, for example, emerging in the aftermath of UNCED, attempted to create an informal system of forest governance which involves participation of governments, industry and other stakeholders.

A variety of environmental groups are using social action (including boycotts) to capture public, industry and governmental attention. A variety of non-government timber certification processes are rapidly gaining influence and provide monitoring of forest management practices. Indeed, with support of buyer groups some of these non-government institutions (e.g., the Forest

Stewardship Council) are gaining significant influence on market access. While the formal international forest governance system appears to lack enforcement mechanisms, NGOs provide an informal, unofficial system of monitoring and enforcement of their objectives.

The current forest governance system is characterized by strong reliance on "soft law" and "goodwill", by informal partial international coordination, by lack of effective enforcement of agreements, by low commitment, low voice and involvement of stakeholders, but increasing leadership from non-governmental organizations, and by weak, fractionated institutional treatment of forests.

4.2 A Council of Forest Ministers of Forest-Rich Countries

In this governance system an element of leadership is introduced to the current system through the establishment of a council of ministers responsible for forests. A permanent council of ministers from countries with high forest cover would provide a more efficient forum for intergovernmental agreement.² Having forest ministers represent the various countries rather than surrogate representatives of forest interests such as agriculture or environment ministers would ensure a more holistic view of forests (with perhaps more emphasis on sustainable development).

Participation of forest ministers may influence redeployment of national budgetary resources, increasing the priority of expenditures on forests in their countries. A smaller group of countries with similar stakes in the forest is likely to be more effective in reaching a consensus and monitoring and implementing decisions. Measures which discriminate against countries with a large endowment of forests are likely to be resisted. Measures which enhance trade in forest products are likely to receive stronger support. Environmental matters will tend to receive

² Note that 15 countries have 75% of the world's forest lands.

lower priority than development and trade issues. The council would complement UN dialogue processes. Forest priorities would receive more attention from multilateral aid organizations.

To ensure, however, that the council is successful in mobilizing political support for forest issues an important part of the meetings of the council should involve parallel and joint meetings of leaders representing the various stakeholders in the process.

In this system, no coordinated centralized, international institutions are created to deal with forest issues. While the policy-making system will be provided with leadership, the implementation system will continue to be decentralized. Thus, for example, mechanisms that require tight international coordination are likely to involve relatively high transaction costs. Since commitments under this governance system are not legally binding, much of the success of the system will depend on goodwill and pressure and support from the public.

4.3 A Formal Central Forestry Organization Under the UN Umbrella

In this governance system the membership of the ministerial council is expanded to provide representation of all countries and a central UN forest agency is established to facilitate implementation of the council's programs.

This central forest organization would replace the FAO as the designated lead organization in dealing with issues concerning SFM. It would assume the many functions of monitoring global forest resource assessments as well as vigorously promote the development of National Forest Action Plans (NFAPs).

NFAPs would serve as the key co-ordinating mechanisms ensuring a global context to national forest action plans, while using such plans as a framework for co-ordinating external aid and technology transfers to encourage SFM.

The organization would provide support for a council of ministers responsible for forests which would direct its activities. The membership, however, would encompass both forest-poor and forest-rich countries from both the North and South. Consensus would be hard to reach and emphasis would be placed on voluntary compliance with SFM objectives entrenched in NFAPs.

The organization would be charged with coordinating global financial mechanisms in support of SFM activities and might use conditionality to achieve compliance with agreed principles.³

Under this governance system consensus would be harder to reach. Implementation is likely to be more centralized and transaction costs of mechanisms which require global monitoring and coordination are likely to be lower. Mechanisms which require innovation and flexibility are likely to encounter higher administrative barriers and demands for standardization.

4.4 Adding Forest Protocols to Existing Conventions (CBD and FCCC) and Widening the Mandates of Existing Multilateral Financial Facilities to Support SFM

In this governance system existing mechanisms are used to provide the basis for legally binding agreements to promote a more holistic perspective in the promotion of SFM. Specifically, forest protocols would be added to the CBD and FCCC.

The CBD covers issues of conservation and sustainable use of forests. It is, however, focused more narrowly on environmental aspects of sustainable use (in particular biodiversity). In November 1996 the CBD's Conference of the Parties urged the development of a broader set of priorities in a work program reflecting more broadly the scope of the issues the IPF dealt with (Bass and Thompson, 1996). The FCCC highlights the role the forest plays in carbon storage and the potential of reforestation and afforestation in helping sequestration of additional quantities of carbon. The clean development mechanism which may allow countries in the North

to offset release of greenhouse gases by protecting or increasing the forest cover in the South, offers an important funding source for SFM.

The secondary strategic focus of the FCCC on planned adaptation to climate change also involves forests, as they are particularly vulnerable to climate change. A forestry protocol may articulate how forests are to be managed to increase their resilience to and buffering capacities against climate change.

Trade aspects (particularly removing barriers to trade in forest products) are already dealt with through the WTO. The Conference of the Parties under each convention may represent narrower views of the forest. Thus, for example, energy ministers may have a louder voice in shaping the FCCC than forest ministers. Forests may not receive the high priority they deserve in the Conference of the Parties. The proliferation of protocols and conventions dealing with the forest may reduce the chance of a coordinated, holistic approach to SFM emerging.

Legally binding agreements take longer to negotiate than "soft" agreements and are more likely to reflect the lowest levels of commitments, however, once commitments are made they are more likely to be implemented. Legally binding agreements, once in place, increase stability of funding and predictability as they reduce the chance of political interference and instability caused by elections.

SFM requires a long-term perspective and thus commitment to legally binding obligations is highly desirable. Indeed, many of the mechanisms which will be discussed in this report, to function effectively, require a legally binding commitment.

³ Donor countries, however, are very likely to resist ceding control of financial mechanisms to a central forest organization.

4.5 A Legally Binding Forest Convention

This governance system involves international acceptance of a comprehensive forest convention. While the depth and breadth of the convention could vary, a convention could: (1) establish a permanent forum (the Conference of the Parties) which highlights an holistic perspective of forest management; (2) obtain a more prominent profile for forests in the international political agenda and national policies; (3) reach common definitions of SFM and provide a global context to national SFM initiatives; (4) provide a legal basis for automatic international fund raising; (5) highlight linkages to other conventions and instruments within and outside the sector; (6) improve the environment for private investment in SFM; and (7) provide stronger protection of the rights of aboriginal forest communities.

Negotiations on a forest convention may highlight the divides between the various stakeholders, in particular forest-rich and forest-poor and developed and developing countries. Indeed, countries in the South may view a forest convention as an intrusion into their sovereign rights to manage their forests. To achieve agreement, the North would most likely have to transfer some resources to the South.⁴ Indeed, without new resources for SFM on the negotiating table a consensus on a convention will be difficult to achieve.

"Although legally binding may be more effective than non-legally binding, states resist legal measures and are therefore likely to weaken/dilute them" (Pearse quoted in Bass and Thompson). However, once in place, binding obligations provide a stable, predictable basis for the long-term commitment that SFM requires.

The diversity of forest conditions may limit the force of the convention to articulation of broad principles and the establishment and co-ordination of funding mechanisms, though

⁴ This may not necessarily be in the form of ODA but could be in the form of the promise of increasing flows of private investment.

regional interests can be addressed in its protocols. While detailed strategies and implementation would largely be left to individual countries, the convention could provide a global context and legitimization to the required change process.

A forest convention is likely to help coordinate and rationalize international and national policies concerning the forest. It may establish the conditions necessary for the effective operations of mechanisms which cannot rely on voluntary behaviours (e.g., international taxation). It can help reduce international uncertainties with respect to SFM, an important precondition to increasing private investment in SFM. It may also increase the salience of the necessary regulatory reforms (in the South, North and internationally). It may legitimize and empower important stakeholders of the forest (such as aboriginal residents of the forest).

5. Relationship of Governance Systems to the Choice and Effectiveness of Funding Mechanisms and the Transfer of Technologies

The larger the number of parties involved in a particular governance system and the greater the heterogeneity of interests, the greater the difficulty in agreeing on a mechanism and implementing it, unless immediate visible benefits to the implementer can be demonstrated. Thus, for example, a council of forest ministers from forest-rich countries would likely reach a consensus on "soft law" quicker than a UN-based intergovernmental process. It can also be instrumental in achieving stronger political commitment to SFM than under the present system.

The greater the degree of change from the status quo, the stronger will be the resistance to the change. The fit of a mechanism with the profile of existing mechanisms, instruments and institutions significantly affects its political acceptability and the chance it will be implemented effectively. Existing institutions (even those which are malfunctioning) develop constituencies and entrenched interests. Change which threatens these constituencies is likely to be resisted. The offer of diffused benefits and hypothetical future benefits is less likely to mobilize support for a new mechanism. Using existing structures to implement change may reduce resistance to change.

The higher the degree of legal commitment, the higher the likelihood of implementing stable funding mechanisms. If a legally binding international framework exists, mechanisms to raise funds such as international taxes on carbon or a "Tobin tax" may be easier to introduce and implement. Within each country the moral and legal force of a binding international agreement is likely to strengthen those who support the measure (the mechanism).

The more institutionalized the governance system, the higher the predictability of system responses. Mechanisms which require a higher degree of environmental stability and certainty are more likely to be adopted and effectively implemented under more formally institutionalized

governance systems. Foreign direct investment (FDI) in SFM is more likely to take place, for example, if legally binding arrangements ensure market access and define the regulatory system. This may be achieved by a Forest Convention or forestry protocols. The formal adoption of NFAPs may also encourage FDI in SFM.

There are antecedent conditions which may change the impact of the governance system on alternative mechanisms. These include: (1) the degree of public awareness and understanding of forest issues; (2) the mobilisation of international NGOs to deal with forest issues; (3) priorities of forest issues in the international political agenda; and (4) the empowerment of constituencies living in the forests. The higher public awareness, the fuller the mobilization of ENGO's, the higher the priority of forest issues in the international agenda and the louder the voice of constituencies living in the forest, the lesser will be the importance of the political aspects of a governance system and the more important will be those aspects associated with implementation and private sector activities. Without external support and reinforcement of SFM, political leadership aspects predominate. In the next chapter we focus on alternative strategies and mechanisms to promote SFM in the South and identify some of their characteristics under alternative governance systems.

6. Strategies to Fund SFM in the South

Correcting market and policy failures and rehabilitating forest degradation in the South will confer important local and global benefits. These activities, however, require some funding. Below we explore alternative mechanisms for funding SFM in the South (many apply also to the North countries). There are three classes of strategies to secure funding for SFM in the South:

- (1) strategies that involve no new money for forests;
- (2) strategies to raise new money for SFM in the public sector;
- (3) strategies to raise new money for SFM in the private sector.

The first class of strategies recognizes that the aid pie is not likely to increase significantly in the near future and that public sector financing in the South is limited. Increases in the effectiveness of existing aid mechanisms, on the one hand, and the promotion of aid through international regulation and/or domestic regulatory reforms, on the other, characterize the specific mechanisms in this class. These two broad thrusts complement each other since without national forest action plans which reflect the global context of SFM, measures to increase effectiveness of aid for SFM will have only limited impact in achieving SFM.

The second class of strategies recognizes that the existence of global public goods and services which are derived from the forest justifies demands from the developing countries for "new money on the table" for SFM rather than just redeployment of aid funds from existing uses to the promotion of SFM. Furthermore, to implement comprehensive national forest action plans in the South, new domestic resources must be mobilised to supplement external funding.

The public sector funding strategies discussed in this report include earmarked domestic and international taxes and user fees, concessionary loans, elimination of distortionary subsidies, and innovative mechanisms such as the sale of tradable permits and carbon offsets. Some of

these measures (e.g., environmental taxes) may have a double impact, generating revenues for SFM while directly correcting market failures that distort forest management.

The tremendous growth in foreign direct investment flows to the South in recent years, which dwarf flows of foreign aid, offers the potential of new monies for SFM in the South.

Net long term international capital flows nearly quadrupled in the first three years of the decade, reaching \$150 billion in 1993. After a slowdown because of the Mexican financial crisis the flows rose, and by 1996 they exceeded US\$200 billion, accounting for more than eighty percent of the aggregate resource flows to developing countries (Jun and Brewer, 1997). By 1994, total flows of private capital reached a level three times greater than official development assistance (ODA). (Gentry 1997) These private capital flows consist of FDI, private loans and portfolio equity investment.

The overall value of technology transfer to developing countries by the mid-1990s was estimated at US\$210-230 billion, and the annual overall domestic investment in developing countries was estimated at US\$1 trillion. According to the World Bank, public sector capital flows to developing countries have stabilized at around \$55 billion per year, with little expectation of any increase. In contrast, the World Bank predicts that foreign direct investment in developing countries will continue to grow at 7-10 % per year until the year 2000.

Use of FDI involves allocation of resources through the market which is likely to increase the effectiveness of spending on SFM. Involving private sector customers and consumers in encouraging SFM through market premia or barriers on market access, requires the development of differentiated markets or marketing channels (e.g., buyer clubs committed to purchase only certified wood). The development of new financial mechanisms to raise funds for SFM (e.g. SFM venture funds) may provide other avenues for private sector participation through portfolio

investments. In societies where post-material values are emerging, avenues for charitable contributions to SFM provide an important role for private sector promotion of the public interest.

One must recognise the fact that any money spent on SFM has an opportunity cost. Furthermore, raising funds may involve high transaction costs and introduce costly distortion to the economy. Significant redeployment of funds also has international and domestic impacts on wealth distribution. Wealth distribution is an intensely political process which often overshadows concerns for economic efficiency. In a later section we provide an evaluation of the consequences of different mechanisms in terms of not only their efficiency and distributive consequences, but also their social and political ramifications. We also explore the synergies and negative cross-impacts between mechanisms. Finally, we will explore the conditions for implementation, particularly the legal and political feasibility of alternative mechanisms.

6.1 Strategies Involving No New Money

6.1.1. Increasing the Effectiveness of Aid Programs

Since an increase in official aid funds is unlikely, attention must instead be focused on increasing the effectiveness of existing funds. A critical evaluation of previous aid programs, combined with an assessment of current environmental needs and problems, can be used to guide new strategies for employing aid funds more effectively.

Two main strategies for increasing aid effectiveness can be identified: (1) increasing international co-ordination; and (2) increasing accountability of recipients and donors.

(1) Increasing international co-ordination: "At present, no single multilateral body, organization or instrument has either a mandate or capacity to address, in a balanced, holistic and mutually-reinforcing way, all issues which are currently on the international agenda, with respect to all types of forests" (IPF, 1998). The development of an international system for collection

and dissemination of information about the programs and activities of agencies involved in SFM should be regarded as a key component of strategies seeking to improve international co-ordination. Other pre-conditions for successful co-ordination include establishing an international mechanism for defining priority areas and monitoring activities of agencies in pursuit of these objectives; clarification of mandates of relevant organizations relating to forest issues; data collection and analysis of current status and trends in forest degradation; increased participation of major groups in forest fora and processes to promote SFM; and more focused and effective funding for and co-ordination of research and development in priority areas of SFM.

"Data sharing, developing common impact indicators and harmonizing evaluation methodologies can all help to cut down on duplication and ensure complementarity of efforts. For maximum effect, this improved co-ordination should be part of a broader partnership strategy, including bilateral donors, which assists recipient partners to formulate, implement and coordinate donor participation in the country's own development strategies" (Paul Martin, 1998). The Interagency Task Force on Forests (ITFF) was established to operate as a partnership mechanism in the field of forests. The ITFF provides a central mechanism for coordinating the activities of member organizations. Members of the ITFF seek to forge institutional synergies with respect to specific elements in the IPF program.

A key element in the co-ordination of the delivery of external aid as well as the mobilization of recipient resources for SFM is the development of a national forest action plan (NFAP) which is informed by global SFM objectives but is developed to reflect local forest conditions and local socio-economic environments. Such a plan can provide the framework for coordinating multilateral, bilateral and domestic SFM projects, as well as provide information to

potential private sector investors. Since the development of such a plan should involve all the principal stakeholders in the forest, its objectives can serve as the targets of conditionality and reduce its threat to sovereignty.

Establishing a central forest agency in each country to coordinate implementation of its national plan can facilitate information collection and dissemination locally and globally.⁵ It can also serve as a national advocate for forest issues. External aid sources may wish to establish, in addition to global coordinating organizations, national offices which can work in cooperation with the central forest agencies.

(2) Increasing accountability: One of the challenges of developing effective aid programs is to find a way of managing the potentially conflicting interests and incentives of donors and recipients in a manner which ensures that environmental objectives are met. The effectiveness of aid programs can be improved by making recipients more accountable for producing environmental benefits from deployment of donor funds. Accountability can be achieved through tied aid or conditionality. It can be enhanced through an increase in the transparency of the decision process and through the development of improved methods for assessing projects and evaluating results. Establishing accountability for donors is also important, and aid programs can be improved through measures designed to make donor countries more accountable for the short- and long-term impact of aid strategies on recipient countries.

Disbursements of foreign aid are guided, in part, by an identifiable need or problem. Recipients of aid often have little incentive to satisfy the identified need or resolve the problem since this might jeopardize future opportunities to receive aid. A solution to this problem of

⁵ Note, however, that in some countries with a federal governance structure the establishment of a central agency may not be compatible with their constitutional structure. The forest agencies may be established in such cases in each state or province.

perverse incentives is to tie continuation of the aid or future awards of aid to some performance conditions. Reasonable and relevant performance conditions which are directly tied to the objectives of the projects typically do not raise much objection and provide the recipient with incentives to meet the targets of the program. If instead of conditions tied to performance outcomes, however, the conditions prescribe the means of program delivery, there is a chance of loss of efficiency since these means may not be well-suited to local conditions, with which the donor may not be acquainted. The increased financial accountability which can be obtained through detailed prescriptions does not guarantee economic efficiency. This approach to accountability may reduce the "learning and capacity" building that recipients with some autonomy may enjoy. Dictation of details may also be perceived as a threat to sovereignty. In addition, the strategic broad use of conditionality to attain specific objectives not directly relevant to the objective of the program, may lead to less effective deployment of aid resources in terms of its prime objectives. Conditionality which takes the form of post-grant conditions is often difficult to enforce. Programs which have involved a pre-grant review of past performance have been more effective in altering recipient behaviour.

6.1.2 International Programs, Codes and Regulatory Obligations

International SFM programs of data gathering and strategy design and implementation can be employed to establish a base-line of environmental protection for forests, as mechanisms for co-ordinating national activities and pooling resources, and to serve as focal points and coherent models of SFM. Such programs may be administered by new multilateral institutions or by existing institutions such as the FAO, or any new leading global forest organization that might be established in a new governance system.

There is a real need for the development of international models providing for coherent approaches to global forest and environmental problems. An international program designed to evaluate global forest problems, assess global forest resources and strategies available for addressing the problems, and identify optimal global strategies for dealing with these problems could be employed to ensure that existing national capacities for SFM activities were fully and effectively utilized to solve global forest problems. Truly international programs would have to be distanced from national priorities and objectives and focused on international problems and agendas. The program of the FAO to assess forest resources provides an example of a first step towards the establishment of a more comprehensive and permanent program for international forest monitoring and strategic design.

International SFM programs could take on either a broad or a narrow focus, including both the development and support of multilateral and bilateral SFM aid agencies and the incorporation of SFM assessments into other aid program approval processes. International SFM programs could be used to co-ordinate SFM funding and activities in order to take advantage of economies to scale and scope.

International regulatory obligations and voluntary codes can be employed to encourage sustainable forestry practices. Options include the design of international guidelines and codes for SFM, use of international certification and/or labelling procedures.⁶ International agreements over a common set of standards could be used to mitigate national fears of losing competitiveness, as well as to open up avenues for achieving a competitive advantage through SFM practices.

⁶ There is little governmental support for government-run certification schemes. We shall therefore consider in this paper only the option of support for privately-run certification schemes.

International codes of conduct for private enterprises could be extended to include investing multinationals, exporters of technologies, and recipient country buyers.

Attention must be given to developing new and innovative international programs for encouraging SFM activity. Examples of such programs include the design of financing mechanisms for SFM demonstration projects, such as a consortium led by the World Bank or Sustainable Forest Market Transformation Initiatives, and development of recognition programs for SFM achievement.

6.1.3 Domestic Regulatory Reform in the South

In order to make investment in SFM attractive and effective at achieving development and environmental goals in the South, countries there must provide an economic structure which is capable of absorbing and utilizing resources. They must provide a relatively stable macro-economic environment and an investment-friendly, stable and predictable regulatory environment. Economic stability is generally tied to political stability, and the success of economic projects is generally closely linked to sound fiscal practices.

Increasing the security of property rights, particularly land tenure, and broadening the participation of stakeholders in resource management can contribute to a sound investment climate. Programs to develop and implement innovative systems of property rights over forest resources, including joint forest management or stewardship and the assignment of legal rights over forest use in conjunction with responsibilities over forest management, can be used to increase investment in SFM. Forest user groups can be given legal rights to forest products from their forests, for example, in return for assuming responsibility for protection and management of the forest. Measures such as the protection of intellectual property rights and patents also become important in the context of foreign transfer of finances and technology. Investors will be

more willing to invest in capital markets which share the same basic infrastructure, including both mechanisms for risk sharing and for protecting investment interests, as those in developed economies.

While stable economic and political systems are preconditions for investment in development, additional measures are needed in order to promote and sustain investment in sustainable development and, more particularly, in sustainable forest management. A coherent plan for achieving broad environmental, economic, and social goals is needed in order to ensure that effective use is made of available resources, new resources are attracted, and conflicts between different development projects are minimized.

Such a plan should include prioritization of SFM objectives and the strategies for achieving those objectives, taking into account competing economic, social, and political demands and constraints and the impact of other policy measures. The plan must be developed by the recipient nation, both in order to protect sovereignty and to ensure that the plan is suited to its unique conditions. Having such a plan is indeed a precondition for effective private and public investment in the forest environment.

Regulatory policies can be designed to achieve environmental objectives by developing codes of practices for SFM based on both scientific and traditional knowledge bases, utilization of standards to reduce waste, using emission standards to control the quantity and quality of pollutants released by targeted sources, and by using technology-based standards which prescribe the type of production process or pollution-control technologies to be used by specified producers. While there has been some concern that stringent environmental regulation may negatively impact economic competitiveness, this need not be the case. Porter (1990) argues, for example, that if the regulators focus on environmental performance and do not impose

constraints on the technology used to achieve identified goals, then strict environmental regulations may enhance the competitiveness of domestic industries in world markets. The argument may, however, be valid only for larger economies with strong technological capacity and not apply to small, less technologically advanced countries.

Market instruments can be used by recipient countries to create an enabling environment for environmentally sound resource use by domestic producers and consumers and efficient investment decisions by domestic and foreign investors. Instituting market measures which promote SFM is likely to have the sort of broad impact on domestic consumption and production patterns that is key to correcting market failures and efficiently achieving long-term SFM objectives. Desirable changes in resource use will feed into future investment decisions and will support rationalization of recipient production processes.

Promising market-based strategies include the development of market mechanisms to deal with environmental goods and services and with other values of the forest, such as recreational uses, as well as policy measures designed to encourage the development of markets for alternative non-wood forest products.

6.2 Strategies to Raise New Money for Forests

6.2.1 Redeployment of Aid

While voicing concern about the global dangers associated with deforestation and forest degradation, aid donors have devoted only a small share of aid money to the forestry sector. In order to meet current SFM needs, methods must be found for increasing the flow of money into the forestry sector through re-deployment of existing aid funds. Strategies for increasing the share of existing aid devoted to the forestry sector can be divided into two categories: (1) measures for increasing voluntary re-deployment of aid; and (2) methods for increasing mandatory redeployment of aid.

Strategies for increasing the voluntary re-deployment of aid funds include making SFM projects more politically attractive to aid donors by increasing public awareness of deforestation, marketing SFM projects more effectively, and generating concern through accumulation of scientific information about potential damage. At a more formal level, voluntary contributions by government to a special global SFM facility or trust fund could be sought. (The prospects for such a move will depend on the governance system and the priorities that forest issues receive under the system).

Presently some support for forest investments is provided by the Global Environment Facility (GEF). The GEF was established in 1990 as a three-year, US\$1 billion program to finance the incremental costs incurred by developing countries in addressing four global problem areas: global warming, bio-diversity loss, pollution of international waters, and pollution of the ozone layer. It was restructured in 1994 and its portfolio raised to US\$2 billion, and currently has funding to last until 2002. In addition to its financial allocation, the GEF has the capacity to mobilize bilateral co-financing and leveraging of private investment through its venture capital fund. The GEF funds three types of projects: those which are economically viable on the basis of domestic costs and benefits, needing only seed funding; those projects with great externalities not justified in terms of country context; and those justified in the country context but needing additional funds to internalise externalities. While many SFM projects have the characteristics of the problems GEF is designed to solve, the GEF currently has limited applicability for forestry (e.g., carbon sinks), focusing primarily on the issues covered by the CBD and FCCC, with 40% of its funds devoted to preserving biological diversity and 40% devoted to ameliorating climate change. There is no expectation of new money and expanding the mandate of the GEF is not a realistic option. Indeed, there are diseconomies to scope, since the expertise needed to manage

substantive allocation decisions may become too diffused. (The economies to scale associated with managing the financial aspects of the facility accrue to it because the role the World Bank plays in its management). An alternative to the establishment of a new Global Forest Facility is a more intensive and coordinated use of World Bank trust funds which allow donor countries to target their donations.

Strategies for increasing the mandatory re-deployment of aid include creating a mandatory assessment under a forest convention, to be financed out of existing aid money, and creating general assessments of dues of international organizations (e.g., reserving a portion of the UN budget for forestry-related issues).

6.2.2 International Taxes and User Charges

The scope for international funding measures to address global concerns about sustainable forestry has received increasing attention. The instruments proposed by various authors, including Mendez (1992) and Crossley et.al. (1996), can be divided into three groups: (1) international taxes; (2) user charges for the global commons; and (3) monetary measures. The first two groups are discussed below, and the third group is discussed in Section 6.2.3. All of these measures involve difficult political decisions and may raise concerns about public acceptability and feasibility.

(1) International Taxation: International tax schemes provide a means of harnessing the benefits of environmental tax schemes while reducing the concern for loss of competitiveness that unilateral action raises. International taxation may involve a variety of arrangements whereby taxes are levied to raise funds ear-marked to a particular international cause and/or organization. The advantage of such a tax is that it may ensure significant automatic fund raising that can be isolated to some degree from temporary budgetary pressures in the countries

committed to participate in such an international scheme. A multilateral agreement to harmonize national taxes also offers potential benefits by addressing the competitiveness concerns of countries seeking to adopt more stringent environmental taxation. Proposals for international taxes include: general taxes such as a tax on international trade or the "Tobin" tax on foreign exchange transactions; environmental taxes such as taxes on traded commodities, for example, fossil fuels; carbon taxes based on the carbon content of different energy sources; consumption taxes on polluting goods; and punitive taxes on polluting behaviour.

The efficiency consequences of proposed taxes such as the "Tobin" tax on international financial transactions, the carbon tax and taxes on air and sea transport, vary depending on the degree to which a tax corrects for a market failure (e.g., pricing externalities) and its macro-economic benefits (and costs). Even taxes that meet the normative efficiency criteria may not be politically feasible. The most prominent political issue is one of loss of sovereignty involved in delegating authority to tax. Other issues involve general reluctance to raise tax burdens with a new tax, especially where the benefits accruing from the tax are not clear to voters and the nations which raise the funds may not have control over the moneys raised.

There are several attributes which determine the political acceptability of an international tax. (Lin 1997) These involve: (1) the degree of control retained by each nation participating in implementing the tax scheme; (2) the rate of taxation; (3) the portion of taxes raised which is earmarked for international transfer; (4) the economic efficiency consequences and their visibility and clarity to domestic publics; (5) the transparency and accountability of the process through which funds raised are disbursed; and (6) the degree to which there is a close link between the activities taxed and the earmarking of expenditures. Below we consider several examples of international taxes.

Carbon Tax: A tax on the carbon content of fuels has been proposed by many as a way of achieving the lowest-cost emission reductions across all fossil carbon sources. Carbon can be viewed as a proxy for a range of environmental damages from fossil fuels, converting rates of environmental harm into an implicit tax on the carbon content of these fuels. Since different fuels have different carbon contents per energy unit, fuels would be taxed differently. Energy users would be provided with incentives to find the best mix of fossil and non-fossil fuels and energy conservation measures for their operations. A properly designed carbon tax regime could be used to increase the cost of carbon emissions and increase the benefits of creating or preserving carbon sinks. Alternatively, the revenues generated could be used to finance environmental measures. Adopting an international carbon tax would only partially mitigate competitiveness concerns but could allow more accurate pricing of the harm of carbon released by fuel consumption (since measuring the full harm of carbon consumption is imprecise, the tax may be lower or higher than the true environmental cost).

Tobin tax: In response to high volatility of exchange rates created by unfettered mobility of financial capital across currencies, Professor Tobin (at the Janeway Lecture in Princeton, 1972) proposed a tax on foreign exchange transactions. The objective was to increase national policy autonomy, which was threatened by speculation. Tobin observed that eighty percent of foreign exchange transactions involve round trips of seven days or less, most occurring within a day. A small tax would raise a large amount of revenue while stabilizing exchange markets (Haq et. al. 1996; Tobin 1978).

Tobin (1978) suggested that it would be appropriate to devote the proceeds of international taxes to international purposes. There are problems with implementation, however.

For one thing, transactions may shift to tax-free jurisdictions. Solutions include moving funds to and from locations with high penalties and taxing on the basis of where decisions are made rather than where transactions occur. The second problem is evasion by substituting untaxed for taxed transactions. The solution is to extend the taxation to derivatives and non-cash asset exchanges. This leaves open the problem of where to end the reach of the tax. Clearly some reduction in volume of transactions due to the tax can be expected. It is proposed that local authorities can be induced to collect the tax by providing them with a share. The major problem is making sure that there are no free riders (e.g., tax-free jurisdictions that will attract transactions). Keene (1996) suggested that to prevent significant tax avoidance through market migration, it may suffice to secure the co-operation of the eight countries that are home to the largest foreign exchange markets.

Forest Sector Taxes: It is argued that earmarking of international (and domestic) taxes can be successful politically if there is a connection between the way taxes are collected and the way they are spent. This argument concludes that to support SFM, forest sector taxes should be targeted. Since the forest produces externalities benefiting other sectors (e.g., water benefits, carbon sequestration), this argument can be rejected on normative grounds. Indeed, we have previously noted that due to market failures forest resources are undervalued in the South (as well as the North, though to a lesser degree). Imposing taxes on the resource or its consumption (as long as the demand for it is not completely inelastic) will lead to a further reduction in the value of forest resources. Forest taxes may be justified if they are deemed to prevent unsustainable forest management. However, most of the empirical evidence suggests that undervaluation of the resource is a course for conversion of forest land to other uses (e.g., agriculture) and taxing forest production or consumption may

therefore accelerate deforestation. From a practical point of view a very small tax rate may have little impact. Politically, however, the idea may not be popular, especially where the direct effects of such taxes are felt (i.e., forest-rich countries).

Forest Products Export and Import Taxes: Some propose transfer of tariff revenues, a move which may not change prices and thus will not distort inter-sectoral allocations. The major dilemma is why governments which enjoy tariff revenues would be willing to give them up. Global import and export taxes will tend to reduce the competitiveness of the forest sector and discourage trade. Discouraging trade is likely to exacerbate the distortion that already exists from under-valuation of forest products and, thus, the incentive to convert forest land to other uses. Free-rider problems may also be created, giving advantage to exporters (or importers) who are not parties to the international agreement.

Taxes on production and consumption: Consumption and production taxes create concerns for sovereignty since they directly impact domestic behaviours. Taxes such as a forest harvest tax will be difficult to implement given the differential effect on competitiveness and the variety of tree species, forest conditions and socio-economic conditions. For example, a forest harvest tax will not recognise differences between traded and non-traded goods of the forest (where the latter are used mainly for subsistence and fuel).

Generally the impacts of any tax or fee scheme depend on their level, coverage and the way they are collected. While a detailed analysis is beyond the scope of this paper, several principles can be cited:

- 1) Taxes that correct for market failures should be set at levels that approximate best the unaccounted environmental damage they intend to internalize. If such damage is high, setting the tax at the appropriate level may achieve the desirable target of reducing the undesirable

behaviour but also lead to a reduction in the tax base. Thus, for example, a punitive tax against polluters may eliminate pollution but with it the revenues generated by the tax will also disappear.

2) Taxes should not distort the efficient allocation of resources in the economy. Generally small tax rates are preferred (except in the cases discussed in 1) above) to minimize distortion and reduce the incentive for tax avoidance.

3) Taxes have distributive impacts which must be considered. A large share of tax revenue is spent by governments to achieve redistribution of wealth. International taxes may also lead to redistribution of wealth among nations. In using taxes for distributional purpose attention should be paid to the transaction and efficiency costs involved.

4) To achieve revenue objectives one must consider the tax elasticity. Increases in rates of taxation beyond some threshold may decrease the money collected (either because the taxed activity is reduced or because incentives for tax avoidance increase).

Some estimates have been made of how much money could potentially be raised by the public sectors (domestic and international) globally for SFM and for other competing objectives from new sources.

Gasoline and diesel taxes: If developing and transition countries raised their gasoline and diesel taxes by one cent per litre, they would have raised US \$7.2 billion in 1996. In the industrial countries, US \$13 billion would have been raised from such a tax (Gandhi, Gray, McMorran, 1997).

Carbon Tax: A carbon tax of US \$10 per ton of carbon on fossil fuels in the world would have raised US \$54 billion in 1992 (Shah and Larsen, 1997).

Removal of Subsidies: The global resource cost of subsidies for energy, transportation, water, agriculture and fisheries was estimated to be US \$870 billion. The major subsidies in the North are on agriculture and transportation, and in the South are on water and energy. Subsidies offer the largest potential sources of domestic financial resources that could be redeployed. (Gandhi, Gray and McMorran, 1997).

Tobin Tax: A 0.1% Tobin tax on foreign exchange transactions would have raised (had it not affected volume) US \$312 billion.

Transfer of tariff revenues: Transferring to the South import taxes levied by the North on forest products from the South would have yielded US \$1 billion in 1997, given the projected tariff reduction associated with the WTO.

Forest Product Export and Import Taxes: Taxing forest product exports and imports at a rate of one percent, assuming no substitution effects, would yield \$1.1 billion.

Forest harvest tax: A forest harvest tax of US \$1/m³ on global industrial roundwood production would yield US \$1.5 billion.

Forest products production and consumption taxes: Amount unknown, but a small, one-percent tax would raise more than US \$5 billion.

(2) *User Charges for the Global Commons:* Taxing the use of the global commons provides an alternative avenue for raising funds for SFM, although it raises concerns about earmarking general funds where the user charges do not directly involve forest resources.

Proposals for user charges include: charges on deep ocean bed mining and ocean fishing; charges for use of waterways and tolls on ocean shipping; parking fees for geostationary satellites; prospecting fees for research on Antarctica; and charges on international communication systems such as posts and telephones. Selling stamps outside of the postal

system has indeed been used as a fund-raising device by various organizations, but its success depends upon the willingness of individuals and governments to purchase such stamps. Most if not all of the other measures have not been widely discussed nor implemented, and remain in need of additional exploration.

6.2.3 International Monetary Mechanisms

A wide variety of powerful international monetary mechanisms for funding SFM in developing countries have been suggested and/or utilized. We consider five categories of international monetary mechanisms: (1) loans; (2) grants; (3) debt swaps; (4) multilateral funding mechanisms to support protocols; and (5) other innovative international monetary instruments.

(1) Loans: Much of the current official financing of SFM in developing economies, particularly financing from multilateral financial institutions such as the World Bank, takes the form of loans which are provided on varying terms depending upon the donor and the nature of the project. Direct loans to finance SFM can take the form of hard loans, at market interest rates, or soft loans, which are provided at below-market rates and are often accompanied by flexible repayment schedules. Loans can be deployed in a variety of different ways to encourage SFM activity. Examples include the use of seed financing in the form of concessional loans, securitization, and use of loan guarantee mechanisms. Some alternative ways in which loans can be deployed to encourage SFM investment are considered below.

Many SFM investment opportunities, particularly those in developing countries, pose too much risk to attract private investors. Loan guarantees can be used to secure private financing for SFM projects which would be too risky to attract private financing on their own. For example, a developed country could guarantee a loan to an LDC partner to engage in SFM.

Funds can be raised in open financial markets using the higher credit rating of the donor to finance "hard" loans

Securitization provides an alternative fund-raising strategy. Securitization involves the conversion of rights into securities that are traded in financial markets. For example, a portfolio of loans can be sold to the public as tradeable securities that give holders the right to a share in the interest and capital proceeds of the portfolio of loans. A package of loans made to finance SFM projects might be sold off to free up new funds, either without recourse (if the LDC credits were strong enough) or with recourse (basically a residual guarantee that if an LDC does not pay, the guarantor would).

Government loan or performance guarantees can be deployed in the absence of well-working insurance markets to cover the risks of SFM projects in developing countries.⁷ Examples of such mechanisms include the provision of special risk insurance for companies who invest in SFM in developing countries, use of foreign investment guarantees (e.g., long term guarantees against political and other risks to encourage private sector), and use of performance bonds (e.g., the developed country provides a back-up guarantee to a performance bond issued by an LDC government or agency to a private sector investor).

(2) *Grants*: While there is little likelihood of increases in grant financing, much of traditional official financing provided by governmental institutions still takes the form of grants. Direct grants can take the form of unconditional, conditional, and tied funding. Attention is now being directed towards more creative and effective uses of grants. Examples of innovative uses of grants include grant programs to local communities for SFM projects. Grants can also be used to

⁷ Without insurance markets, investors cannot protect themselves from risks by buying insurance. Without knowledge of the magnitude of the political risks involved in SFM investment in a South country, for example, and without the means for buying protection, they will tend to avoid investing in it. The availability of insurance reduces this financial market failure.

create new avenues for leveraging financing through markets. Aid donors are increasingly interested in projects which involve matching funds, both because this ensures that the recipient has a stake in the outcome of the project and is thus likely to have better incentives for ensuring project success, and because of the greater scope for obtaining real environmental benefits from leveraging and pooling of funds.

(3) *Debt:* Debt-related measures have been given considerable attention by governments of developed economies and multilateral institutions in the face of concerns about the heavy and in some cases unsustainable debt burden borne by many developing countries and their inability and/or unwillingness both to repay these debts and to invest in sustainable resource use. To provide some idea of the magnitude of the debt burden, in 1993 there was US\$1.8 trillion in outstanding developing country debt. Proposals for harnessing this debt to induce conservation efforts have included debt-for-nature swaps.

Debt-for-nature agreements reward developing countries for adopting conservation measures, such as creating nature reserves, by writing off some of their debt. Debt-for-nature swaps were initiated by environmental NGOs such as the World Wildlife Fund who tried to create an issue linkage between debt and the environment by purchasing debt on secondary markets and exchanging it for local currency used to fund local conservation projects (Jakobeit, 1996). The swaps became financially attractive when the resale prices of commercial debt dropped due to the debt crisis. From 1987 to 1994 thirty-two environmental swaps were completed in fifteen debtor nations, most of them in Latin America, and they reduced the stock of commercial foreign debt by US\$177 million and generated about US\$130 million in domestic currencies for conservation at an initial cost of US\$46 million (a leveraging factor of 2.3 for the NGOs). The swaps peaked in the early 1990s and have subsequently declined. The most

successful swaps were bond based and relied on empowering local NGOs who shared similar environmental objectives to their international counterparts.

Governments in developing countries followed the lead of the NGOs and, in a second phase of swaps, wrote off public bilateral debt in exchange for environmental commitments from debtor countries. These second-generation swaps have exceeded US\$1 billion. The pressure on multilateral development banks to follow suit is likely to increase as developing countries rebel against their heavy debt burdens, but these institutions are unlikely to have much interest in debt forgiveness (Jakobeit, 1996). Concerns with this mechanism include the short-term nature of many of the agreements, the dependence of the agreements on the ability of local NGOs to enforce them, concerns about sovereignty and about debt forgiveness, and difficulties in linking two seemingly unrelated issues.

Debt-equity swaps provide an alternative way of harnessing existing debt to achieve SFM objectives. Debtor countries could use debt forgiveness in return for equity in a forest preserve, reforestation project etc. The equity might be held and sold when the forest has neared marketable age. Debt-to-equity conversions could also be employed on SFM-related investments.

Conditional rescheduling of debt, conditional discounted buy-back of debt, conditional interest reduction on debt and conditional conversion of foreign currency debt to local currency debt provide alternative avenues of inducing SFM activity by governments in developing countries. Enforcement of conditions is likely to be difficult, however, and imposing conditions may exacerbate frictions between debtors and creditors. Other initiatives based on the same idea include debt forgiveness to restore capacity to invest in sustainable development of the forest and debt forgiveness in return for investment in environmental protection.

Foreign donors may also buy at a discount public foreign currency debt of a country in the South, convert it to local-currency high interest-bearing debt instruments and use the interest to support local activities in local currencies (e.g., ENGO activities). There is a dual advantage: the country in the South is relieved from servicing debt in a foreign currency, while the donor can receive high-yield returns to support local activities.

(4) Multilateral Funding Mechanisms to Support Protocols: There is a new trend towards the creation of funding mechanisms along with global conventions. Both the Global Environmental Facility and the Montreal Protocol Multilateral Fund provide examples of such mechanisms, and the Kyoto Protocol is likely to yield an additional financing mechanism of some sort. These funds are used to address specific environmental problems that affect both developing and developed economies. If a forest convention is ratified, it may lead to the establishment of funding mechanisms similar to those established for other conventions.

The Montreal Protocol Multilateral Fund was established in 1990 to help developing countries with the costs of phasing out substances that deplete the ozone layer. Some commentators claim that in effect, the fund was used to "buy" the participation of developing countries in ozone depletion measures. The fund operates as a contractual mechanism which channels money to projects which are specifically aimed at phasing out ozone-depleting substance use in developing countries. The fund has received favourable reviews due in part to a system of governance which includes equal voting power and an independent secretariat. While there is little scope for increasing the mandate of this fund to encompass SFM projects, the fund provides a good model for a similar forestry fund. There might be more scope for forestry sector funding through any financial systems which are developed to support the 1997 Kyoto Protocol.

Emission trading schemes introduced at the international level could also be used to achieve environmental goals. The Kyoto Protocol (1997), which includes emissions trading and joint implementation, provides an example of such a scheme. Under the carbon emission trading and offset regime, industrialized countries may buy and sell emissions credits among themselves, and a "clean development mechanism" permits industrialized countries to receive credit for financing emission-reducing projects in developing nations.

(5) Other innovative proposals for international monetary measures: Proposals include issuance of new special drawing rights by the IMF for SFM, sale of gold reserves by the IMF, temporary borrowing of gold reserves (proportionate to potential pollution emissions or other ecological damages) to finance SFM funds, tax-exempt bonds for SFM, and establishment of an international environmental trust fund.

6.2.4 Domestic Market-Based Instruments to Raise Funds and Promote Sustainability in the South

With regard to fund-raising measures in the South, market-based instruments offer an important source of revenue. Many of these measures also have desirable effects on polluting behaviour by internalizing environmental costs and costs associated with resource depletion. Funds can be raised through measures such as the use of environmental taxation, beneficiary taxation, full-cost pricing, removal or reduction of harmful subsidies, fines on wasteful uses, measures to increase rent capture, and the sale of reforestation or forest management bonds (see Panayotou, 1995, Panayotou, 1997). These measures could be taken independently by countries of the South to correct for market failures and raise revenues for SFM.

Market-based instruments influence economic choices through price signals rather than explicit instructions, harnessing market forces to achieve efficient resource use. There are several key arguments which are traditionally made in support of market-based approaches to

induce environmentally beneficial choices by individuals or firms. The first is that market-based instruments will lead to a more efficient allocation of pollution abatement resources within the economy than regulation. A second argument is that market instruments will provide incentives for "dynamic efficiency" and technological innovation. A third advantage of environmental taxes and charges is that they create revenue. They also tend to be cheaper to administer than regulatory programs. A fourth argument in favour of market instruments is that they may be less vulnerable to capture by rent-seekers than regulation due, in part, to the increased transparency of the measure and the reduction of discretion in its application.

Factors which can adversely affect firm performance in response to market instruments include transaction costs involved in implementing the program, uncertain property rights, uncompetitive market conditions, an existing regulatory environment that does not provide the appropriate incentives to participate, and flaws in internal organization and management structure which impede efficient responses to changes in environmental market instruments. Concerns about effectiveness include the fact that market instruments may not be sensitive to factors such as forest condition (land type, species composition, micro-climate) and the disparate economic impact on different industries and regions of the economy. In the case of selective application of market instruments to particular types of pollutants or industry processes, or application of market-based instruments on top of existing policy instruments, the result could be a distortion in resource allocation across sectors and regions. A comprehensive package of green fiscal reform measures is likely to be more successful than a piecemeal approach to different pollution problems. Unilateral environmental taxation measures may raise competitiveness concerns vis-à-vis other countries. In addition to economic factors, public acceptability and political feasibility are important components of any proposed market reforms.

Market-based instruments can be divided into five broad categories: (1) charges imposed on polluters, such as effluent charges and product taxes; (2) subsidies (and full-cost pricing); (3) deposit-refund systems; (4) market creation, including emissions trading; and (5) enforcement incentives. Factors which will influence the choice of mechanism include the nature of the forest and forest product sector, the type and distribution of information available, the nature and magnitude of uncertainty about abatement costs and benefits, the ability to monitor and enforce a given scheme, and political constraints (such as acceptability and strength of public support).

(1) Environmental taxes and charges: Environmental taxation and related charges can be used to raise funds for investment in SFM. Taxes on pollution serve the dual purpose of internalizing externalities and raising revenue. These taxes can take the form of direct taxes on unsustainable forest practice (e.g., logging operations which do not involve SFM planning or involve forest land conversion) and on pollution (e.g., emissions charges), or indirect taxes on pollution via taxes on production, inputs or consumption goods. Examples of indirect taxes include taxes on fossil fuels and carbon taxes, waste taxes, watershed charges for polluters (e.g., taxing loggers for waterway use) and taxes on polluting goods. Objective-oriented taxation, or the use of specific charges on forest products to raise funds for forest management, could be regarded as a means of incorporating the true cost of resource use into forest products. Surcharges could be imposed on resource use in situations of emergency. Beneficiary taxes for the enjoyment of non-marketed benefits could be used to extract money from downstream beneficiaries of conservation efforts. Examples include entrance fees to national parks and reserves. (Chandrasekharan(b), 1996).

The potential benefits of "green fiscal reform" have been widely accepted by a number of European countries, where environmental taxes provide a growing share of tax revenues. In

Denmark, Norway, Sweden and the Netherlands, for example, environmental taxes comprise 5 to 10 percent of total tax revenues and 2.5 to 4.9 percent of GDP. The International Institute for Sustainable Development has come up with similar projections for Canada should it adopt green taxes. Excise taxes on fuels are the most common environmentally-related taxes employed in OECD countries and raise the greatest share of revenue. Canada has experimented with the use of environmental taxes in several different areas. These include provincial vehicle efficiency taxes, excise taxes on heavy vehicles, and special provincial taxes on tires, lead acid batteries, beverage containers and other commodities. Provincial and federal tax incentives have also been employed, including special write-offs for renewable energy and energy-conservation investments, energy efficiency, water and air pollution control, and wetland rehabilitation. Federal and provincial taxes have not, as a general rule, been designed based on assessments of environmental damages or environmental targets, however, and the assessment of environmental taxes in European countries is little better.

Examples of environmental taxes which have been proposed include the following:

Effluent Charges: Effluent charges generally provide the most direct and transparent connection between the adverse activity and the environmental effect. They are taxes or fees paid on discharges of pollutants into the environment based on the quantity and/or quality of discharged pollutants. Ideally, by internalizing pollution costs, such charges encourage a company to reduce its pollution to the point at which the marginal cost of abatement equals the tax rate.

Energy Taxes: Energy taxes have been suggested as one means of redressing environmental damage. Where use of energy has negative externalities, economic theory would suggest that a corrective tax could be used to equate private marginal cost with social marginal cost

of polluting. Although environmental reasons have been offered in support of current energy taxes, studies suggest that actual tax rates do not reflect actual damage costs and that the ranking of taxes would change considerably if they did. Important questions to consider include whether pollution taxes can be added to existing taxes and whether energy taxes can be designed with only the environmental externalities in mind. Carbon taxes, based on the carbon content of fossil fuels and other energy sources, provide an alternative form of indirect tax on pollution.

Consumption Taxes on Polluting Goods: One option is to impose a consumption tax on wasteful and polluting goods, such as fertilizers, pesticides, and unrecycled paper. The tax can be used to internalize the harmful effects of the good into consumption decisions. Less direct methods of taxing pollutants include imposing taxes on fuel-inefficient cars and other such goods which have harmful polluting effects when used.

Consumption and Production Taxes on Non-SFM Forest Products: Taxes on production and consumption of non-SFM goods could be used both to internalize the costs of unsustainable forest use and to encourage firms to adopt sustainable practices. The difficulty, however, lies in the need to reach a domestic definition of SFM and certify forest producers.

Export and Import Taxes on non-SFM wood products: Similarly, import tariffs and export taxes could be used to change the relative prices of SFM and non-SFM products and to internalize ecological costs. The difficulties in implementing this measure are larger than the domestic imposition of consumption taxes on non-SFM forest products. This measure cannot be implemented without a forest convention providing an accepted definition of SFM and the installation of an internationally recognized certification program.

User Charges and Administrative Charges: User charges are taxes or fees to pay for the cost of collective or public treatment of effluents. Administrative charges include control and authorization fees to pay for the services of the regulatory authority. A number of countries have considered the use of a waste tax based on unit pricing for collection and disposal services. While such a tax could be used to incorporate the cost of waste into decision-making, it is difficult to design a system which achieves this goal. The impact of the waste tax has been difficult to determine, and while Denmark (a leader in the use of waste taxes) has achieved a 26 percent reduction in the quantity of waste brought to its municipal landfills and incinerators, this could be attributed to other policy changes such as mandatory recycling and the establishment of recycling plants.

User fees, levies and charges associated with forest use: Examples of fees which could be imposed on forest use include bio-prospecting fees and rents generated by government-owned bio-diversity patents. Licensing or certification fees for production or sale of forest products could also be used to raise revenues for forestry purposes.

(2) *Full-Cost Pricing and Removal of Subsidies:* The sale of forest resources and products is an important source of revenue, particularly for countries in which forest resources are largely government owned. Rent capture on natural resources such as timber is extremely low in most developing countries, however. Under-pricing discourages investment in forest management and makes alternative non-wood uses of forests less attractive. Full-cost pricing, including the removal of inefficient subsidies, would achieve the dual goal of aiding in conservation efforts and providing funds for forestry investment.

The elimination of inefficient subsidies in non-forest areas (e.g., agriculture) could also provide a source of funds for use in the forestry sector, creating a dual benefit of revenue and

more efficient resource use. Indeed, the removal of agricultural subsidies may help reduce the incentives to convert forest land in agriculture. Note that while in practice subsidies are often inefficient and socially wasteful, subsidies may be beneficial where activities have public goods aspects e.g. afforestation or research and development on clean technologies.

As we have previously suggested, obtaining political support for earmarking a revenue source to spending on an unrelated objective may be difficult. While one can argue that forests produce externalities and therefore should be subsidized, governments are more likely to agree to earmarking for forest-related projects revenues which are derived from the forest sector. Capture of a larger portion of the rents derived from public forest lands may generate funds only in the forest-rich developed countries. In developing countries half of the wood cut is used as fuel and for subsistence and would not generate revenues.

(3) Offsets and other forms of Market Creation Allowing firms to trade in permits to impose certain environmental damage may help increase the efficiency of the deployment of such permits. Thus, for example, an efficient firm may buy a permit to log additional areas from a less efficient firm. The total harvested area remains constant but the economic benefits may increase. Allowing firms to buy offsets (i.e., buy contributions to environmental values from another firm in order to achieve regulatory requirements) also can improve efficiency. Since afforestation and reforestation typically create environmental benefits, funding for such activities can be secured if enterprises outside the sector can invest in afforestation to compensate for other environmental damages (e.g., carbon emissions). As we shall note in a later section, carbon sequestration offsets promise to be an important source of funding for SFM in the South.

(4) Enforcement Incentives: Finally, enforcement incentives are created when a penalty is attached to a particular undesirable environmental behaviour (e.g., ecologically damaging

harvesting). Enforcement incentives can be created through use of non-compliance fees or through performance bonds which are refunded once regulations have been complied with. Fines could provide a source of funding for environmental objectives. Where the government has established certain guidelines for resource use, fines could be imposed for non-compliance.

(5) Other Innovative Measures:

SFM Performance Bonds: Environmental performance bonds could be used to shift the responsibility for controlling deforestation, monitoring and enforcement to individual producers while retaining greater control than an outright sale of forests. Under such a scheme, concessionaires are required to make a deposit into a government-managed fund which is returned only if the forest meets pre-specified standards at the termination of the lease or concession term. The bond must be set high enough to make SFM practices more profitable than forfeiture of the bond. Interest from the funds can be used to invest in the promotion of SFM.

6.3 Strategies to Raise New Money in the Private Sector

6.3.1 Foreign Direct Investment

Official development finance (i.e., non-concessional public finance or ODA) accounted for only 40% of total capital flows to developing countries in 1996, down from nearly 70% in the mid-1980s, with no increase expected. In contrast, private capital flows in the form of investment and lending have increased each year since 1991 and by 1996 accounted for 60% of total development financing. A significant amount of this private capital has flowed into the forestry sector of developing economies. Billions of dollars of private capital are being invested in production of paper and wood products in countries across Southern Asia and South America, for example, and by the mid-1990s plans had been consolidated for foreign investments of \$300 million of foreign capital over a four-year period in China and \$5 billion over a five-year period

in the former Soviet Union (Crossley et.al., 1996). Private sector direct investments, if properly channelled, offer perhaps the best source of new money for SFM in the South.

Markets for sustainable forest products represent a potential that has not yet been realized. Expected green premia have not materialized in most markets. However, rising consumer awareness and efforts by industry and ENGOs to establish standards and certification procedures for forestry goods may reduce the market access of non-SFM forest products, making SFM the standard for the main forest products market. The difficulty is that definitions of SFM vary considerably and there is little agreement. A forest convention may help establish more uniform methods to judge whether a particular type of forest operation is sustainable.

Clearly, attracting private capital to the sustainable forestry sector is essential if the investment needs of this sector are to be met. While private investors already play a key role in the forestry sector and a variety of private financing mechanisms are in place, the challenge is to channel existing private capital flows towards more innovative and sustainable forestry. Attention must be focused on increasing the attractiveness of sustainable forestry investment opportunities and convincing investors that investing in this sector makes good business sense.

Lack of information, high risks, externalities and financial market failures are the main causes of the market failure that underlies underinvestment in SFM.

At the Pretoria Workshop on Financial Mechanisms, Crossley et. al. identified four preconditions for increasing private sector capital flows into sustainable forestry: (1) education and engagement of capital markets about the investment opportunities in this sector; (2) mitigation of the risks specific to sustainable forestry; (3) covering the incremental costs of internalizing environmental externalities; and (4) funding the incremental costs of moving capital into sustainable forestry. Action to meet these preconditions will help reduce the market failure.

Education of global capital markets: Lack of knowledge and information about SFM opportunities is a key impediment to SFM investment. Investors must be informed and convinced that investing in SFM makes good business sense. Key to this effort is the design and implementation of programs for gathering, analyzing and disseminating data about emerging SFM investment opportunities. Enhanced use of financial media and the creation of communication networks between buyers and suppliers of forest products can be used to increase the marketability of SFM opportunities.

Mitigation of SFM Risks: There are a number of risks particular to the sustainable forest management sector. First, as with any new sector, investors are unfamiliar with the sector and cannot rely on previous track records. Second, forest investments are often complex and require long time horizons and unavoidable uncertainty as to outcomes. Third, there are more general market-based risks associated with investing in the forests of developing economies, including concerns about the security of property rights and the stability of regulatory regimes.

Crossley et. al. (1996) identify several financial vehicles for addressing some of these risks: (i) Early Stage Funds, composed of public sector funds which are used to target early investment opportunities in emerging sectors, define the investment opportunity, and attract private co-financing; (ii) Sector Defining Funds, which are established to focus investments on existing unexploited opportunities in SFM, defining the investment opportunity, educating selected investors about the sector, and starting the flow of new capital flows into the area; and (iii) Value Chain Investing, an investment approach where capital is channelled to investment opportunities at different stages of the sustainable forestry sector's value chain, based on the notion that a strong industry requires a strong value chain.

Covering Incremental Costs and Resolving Financial Market Failures: Incorporating sustainable resource use practices into traditional modes of business operation imposes incremental costs on businesses producing some benefits that cannot be internalized, thus leading to underinvestment. Examples of these costly new practices include baseline assessment of the biodiversity of forest ecosystems to determine the economic value of non-timber forest products and tree species, monitoring the impact of harvesting activities on the productivity of forests, and developing comprehensive forest management plans. These incremental costs could be addressed through subsidizing or offsetting the costs or through increasing market demand for sustainability through use of forest management certification and wood product labelling. (Crossley et. al., 1996). Similar methods could be used to cover the incremental expenses of moving capital to a new investment area, thus resolving failure in the financial markets.

Regulatory barriers on capital flows (by countries of both the South and North) are also a cause of the market failure that impedes investment in SFM. Removal of such barriers (especially barriers to foreign investments in forests) may increase the flow of FDI to the sector. Trade barriers on exports of forest products from the South to the North should also be removed to ensure market access and price levels for forest products, thus encouraging long-term investment in forest resources.

To ensure that FDI indeed promotes sustainable forestry, additional measures are necessary, including: (1) building the capacity of recipient countries to screen FDI in terms of the capabilities and commitments of investors to engage in SFM and transfer SFM technologies to the South; (2) building the capacity of recipient countries to adequately regulate forest development according to SFM principles; (3) supporting the generation of scientific knowledge which will permit adaptation of North SFM technologies to the local conditions of recipient

countries and allow the latter to exercise appropriate controls in selecting appropriate technologies; (4) encouraging partnerships between local and foreign companies to facilitate the development of local SFM capabilities and to facilitate the transfer of local knowledge of ecological systems to the joint enterprise; (5) developing codes of behaviour or regulation with respect to international investments in forestry; and (6) providing mechanisms to compensate investors in the South (local and foreign) for incremental expenses associated with the production of global and local public goods involved in SFM.

6.3.2 Correcting for Financial Market Failures in the South to Stimulate Local Private Sector Investment

While some SFM investments in the South may be financially viable from the outset, in many cases sound environmental investment opportunities may require initial public sector involvement in order to make them attractive to private investors. Public/private partnerships provide an important avenue for catalysing private investment in emerging SFM opportunities. Public funds can be used as leverage to mobilize private capital and to stimulate interest in the SFM sector. Public funds can be used for co-financing of SFM projects by taking equity positions or by providing loans or loan guarantees. Co-financing arrangements may include arrangements where governments or foreign donors provide the capital to establish SFM projects in the South while local private sector partners provide other resources (e.g., forest land and labour) and part of the capital.

An important category of public-private partnerships is the publicly-funded intermediary for the transfer of environmentally-sound technologies. These intermediaries provide pre-investment support such as funding feasibility studies, identifying investment partners and designing financially viable proposals.

Small and medium enterprises often encounter difficulties in obtaining capital and programs to improve access to credit for small forestland owners and entrepreneurs could alleviate the problem. These programs may include: (1) concessional micro-finance programs; (2) public loan guarantees; grass-roots rural collective financing programs (e.g. solidarity groups, village banks, community co-ops).

6.3.3 Internalization of Externalities to Stimulate Private Sector Investments in SFM

Tax incentives and subsidies can be used to internalize externalities so as to correct for private sector underinvestment in SFM. Measures may include tax credits, tax holdings, exemptions and abatements, lower tax rates and outright cash grants. Tax credits, however, may not be effective in stimulating investments in innovation since often such investments generate no taxable income in the initial stages of the investment. Refundable tax credits may resolve this problem.

6.3.4. Arrangements to Stimulate Investments that Do Not Involve Governments

A variety of private sector arrangements can be promoted to encourage investment in SFM. Credit from suppliers of equipment and venture capitalists may be an important source for financing technological transfer and innovation to support SFM.

Arrangements can be made through which private sector investors (typically suppliers of equipment or foreign companies possessing know-how and capital) get involved in a development project and are granted temporary ownership rights until they get the agreed upon returns from the earnings of the project.

In financial markets a variety of instruments can be devised to mobilize investments in SFM. These instruments rely on public commitment to SFM and awareness of the long-term opportunities for growth and profit that sustainable forest management can produce. Examples

are green saving plans, green credit unions and banks, sustainable forest management mutual funds and venture funds. Venture funds have an additional advantage. While they help mobilize capital they also inject business rigor and attract management talent. In all these types of ventures investors accept remuneration at below-market levels because of their commitment to environmental values.

6.3.4 Private Donations

Private donations may play an important role in supporting SFM in the South. International environmental groups are raising significant amounts of contributions to benefit conservation and reforestation projects. These fund-raising activities are stimulated by tax credits provided by most countries in the North for charitable organizations. Despite the low average per capita income levels in the South there is a significant wealthy class that could be encouraged to make voluntary contributions. Such contributions can be facilitated by appropriate recognition programs. Endowments for SFM can be set up with public seed funding to encourage donations from the private sector. Matching public funds can stimulate donations for SFM projects. The development of private charities specializing in the support of SFM in the South could be encouraged.

7. Increasing Sustainability of Funding: Key Attributes

The following characteristics of a financial strategy strengthen the ability to deliver environmental programs (e.g., SFM encouragement in the South) in a sustainable manner: (1) automaticity of measures; (2) leveraging of public funds; (3) market and policy failure correction; (4) capacity building; (5) constituency building; and (6) low transaction and enforcement costs (to prevent free riders).

(1) Automaticity of Measures: Measures that do not require repeated approval from fund providers, once in place, increase predictability of flows of funds and allow for better planning and more effective use of funds. Thus, for example, international taxes, if mandated by legally binding agreements, may provide a stable source of funding for SFM. Voluntary measures supporting a specific program are less predictable since the propensity to contribute to a specific cause can be affected by a variety of short-term and often irrelevant factors such as the relative salience of the project, changes in budget conditions of key donors, and changes associated with the political clocks of key donors.

(2) Leverage of Public Funds: An increasing demand for aid has coincided with a stagnant or shrinking pool of donations, and SFM programs must compete with numerous other pressing issues for scarce public funding. Public donors are now more inclined to support projects where public funding is leveraged by contributions from other public donors, private sector sources and recipient funding. Leveraging with private sector funds (especially those which are raised as part of market processes) is preferred if it brings market discipline with it to government resource uses, although such strategies incur the risk that rent-seeking behaviour may lead to subversion of original project goals and public spending on the project may appear to be a subsidy to profit-making enterprises. Leveraging with recipient (private or public) resources is also generally

desirable, since reciprocal allocation of funds may show commitment to project objectives as well as providing local knowledge. Indeed, when dealing with forests, the participation and commitment of local stakeholders is a precondition for sustainable forest management.

(3) Market and Policy Failure Correction: Markets achieve efficiency in societal resource allocation. A financial strategy which corrects for market failure is desirable since it both raises resources for the cause and makes a contribution to the achievement of societal goals. Such a strategy of promoting economic efficiency also tends to enjoy political advantages. Thus, for example, an environmental tax that leads to socially desirable behaviour is more likely to be acceptable to the public than a tax which leads to waste through distortion of resource allocation. Strategies that correct policy failures also would attract support.

(4) Capacity Building: From a dynamic point of view, sustainability of fund raising depends on the effect it has on the ability of society to mobilize resources and use them in an effective way. If recipients fail to absorb and utilize donor funds in ways which yield demonstrable benefits, donors will be reluctant to continue funding. If recipients are able to expand their capacity to invest in productive activities, they can provide donors with increasingly attractive investment opportunities. Moreover, expanding recipient capacity to engage in SFM will allow for increased stakeholder participation in SFM, creating a closer alignment of donor and recipient interests and improved utilization of local knowledge.

(5) Constituency Building: The sustainability of a financial strategy depends not only on its political acceptability but also on its ability to build constituencies which will support it in domestic and international political discussions and which will maintain interest in it. Increasing the salience and the perceived importance of SFM via the development of stronger interest groups, such as environmental NGOs and advocacy groups, can play a key role in channelling

public and private funds into SFM. Capacity building and strong involvement of recipients in managing aid funds is likely to reduce the threats to sovereignty that financial measures may impose.

SFM constituencies can be developed through education programs in schools and universities and utilization of media channels to promote awareness and mobilize resources. Programs that build problem identification and environmental assessment capacities can also be used to increase recipient country awareness and ability to invest in SFM.

Environmental NGOs and advocacy have played a key role in SFM activities, both directly through project initiatives and indirectly through public pressure on governments and private firms to support SFM through, for example, the use of greener technologies, and empowerment of NGOs and environmental advocacy groups should be regarded as a fundamental part of any SFM strategy. Possible strategies include increasing NGO roles in funding, testing, assessing and guiding appropriate technology development and, at a more general level, increasing the capacity of interested groups to contribute to, guide and articulate SFM needs.

(6) Low Transaction and Enforcement Costs. Measures which are costly to implement and enforce may decrease welfare. As important, however, is the political image of the mechanism. Lack of stringent enforcement (e.g., the ease of free riding) and high collection and distribution costs are likely to generate opposition to the measure.

8. Evaluation of Mechanisms and Conclusion

Our analysis suggests that the greatest potential for new money for forests in the South could result from the clean development mechanism in the FCCC. The sale of carbon offsets (i.e. exchanging obligations to reduce emission of greenhouse gases for afforestation or reforestation investment in the South) can result in a large flow of funds for forests in the South. This is an excellent example of internalization of global public goods by businesses. The amount may be large depending on the degree to which the Kyoto Agreement is implemented. This win-win situation should create little resistance except perhaps from environmental NGOs who may see offset sales as a means for legitimizing environmental degradation.

International eco-taxes are very attractive conceptually but are unlikely to be adopted as internationally earmarked taxes. Indeed, while many countries have imposed gasoline and energy taxes, few are likely to give up their lucrative revenues or add to their citizens' tax burden. The earmarking of forest-based taxes is more likely to be accepted internationally, but is likely to be resisted by both forest-rich countries and those with high demands for forest products, as they will carry a larger share of the tax burden. Tobin taxes may raise a large amount of revenue, but the decision of how to use the revenues is a political one. Given the current low priority of forests (compared, say, to debt forgiveness) it is unlikely that this or other taxes will be directed to SFM. International taxation requires a framework that ensures compliance and prevents avoidance and free riding. This can only be obtained, in a less than utopian world, with a legally-binding system offered by a forest sector convention (or at least legally-binding forest protocols to other conventions). Collection of international taxes should be left to national governments to reduce threats to sovereignty and lower transaction costs. The major industrialized countries must join the scheme and commit to earmarking. The chance of

agreement will not be large since different countries will be bearing different shares of the taxes depending on their economic structure, resource utilization profiles and the nature of the tax. For example, countries with energy-intensive industries are less likely to accept energy taxes since they may hurt their competitiveness (at least in the short run, which often is all that matters in political decision-making). Generally tax burdens in the industrialized world are considered high and selling to the public measures which are not revenue neutral will be difficult.

From a political point of view earmarking is likely to be more acceptable if taxes are imposed on the sector to which the taxes are earmarked (this is true also when dealing with domestic taxes). This suggests that only taxes imposed on the forest sector are likely to be earmarked to forestry. While from a theoretical point of view there is no justification to finance SFM in the South by taxing only forest-related activities (unless such taxation is to correct market failures in the sector) from a pragmatic point of view a tax on consumption with a rate low enough to avoid any market distortion (i.e., prevent substitution efforts) may be acceptable. The problem is that such a tax may not raise significant funds.

Elimination of distortionary subsidies is a measure which would be praised by every economist, but resisted fiercely by those receiving the subsidies. Diffuse benefits in the future and concentrated costs in the present are not a good combination for sound politics. Furthermore it is not likely that any savings gained could be easily diverted to supporting foreign aid in general and SFM in particular. Again legally binding obligations under a convention may provide the moral authority for governments that wish to correct the market distortion of inappropriate subsidies to resist rent-seekers who want to maintain them. It is not very likely, however, that governments will accept legally binding obligations to reform their domestic regulations. It is more likely that they will accept such obligations as a "soft law".

Voluntary certification schemes and eco-group actions require little official acceptance. They are effective, low-cost influence measures that may shape FDI. The problem they may create is one of uncertainty, which typically depresses the value of resources (and thus may lead to conversion of land from forestry to other uses). A convention can do much to alleviate uncertainty by encouraging the development of an agreed-upon definition of SFM and criteria and indicators to monitor progress toward SFM. Ensuring free trade in forest products by linking a forest convention to international trade agreements is another measure which may contribute to enhancing the role FDI plays in SFM. A forest governance system led by a Council of Forest Ministers is likely to provide strong support for the maintenance of free trade in forest products and contribute to the resolution of undervaluation of forest resources.

Channelling FDI to SFM offers a good potential source of funds, especially if financial resources are available to correct market failures. General measures to promote FDI in the South are being implemented and despite the recent monetary crises the long-term trend will see an increase in FDI to the South. A forest convention which sets international standards of performance is likely to reduce myopic flows of investment that reduce sustainability and increase the share of FDI with a long-term view that contributes to sustainable forest management. Enforcement through the market (e.g., timber certification) and environmental group actions and monitoring may accomplish protection of forests more effectively under the existing governance system. The major problem with such activities is the diversity of SFM definitions and standards that exist and the lack of a scientific basis for choice among the competing definitions. A governance system with a strong lead central forestry organization could provide an alternative to a patchwork of voluntary monitoring SFM evaluation schemes. The activities of such an organization may be further enhanced by the existence of a binding

forest convention which will confer legitimacy on its operations and provide agreed-upon definitions for its assessments.

Private monetary measures and charitable activities are important but are not likely to generate significant amounts of capital for SFM in developing countries.

Strategies that involve no new money are attractive and are synergetic with all other mechanisms. Increasing international co-ordination of aid will involve, at a minimum, the largest aid donors and aid recipients and the major multilateral aid organizations. There is broad acceptance that co-ordination must improve. The transaction costs of measures such as opening "country" offices to co-ordinate aid projects would not be large. Coordination would improve under a governance system which involves a central international forest organization. Such an organization would facilitate data sharing and help develop common impact indicators and cut down duplication. Pooling of resources from bilateral programs into central multilateral programs may help gain economies to scale and scope. Generally there will be less overt resistance to increased coordination, though some major donors may want to keep a measure of autonomy for their programs to preserve their national identity (thus resisting pooling of funds) and obtain maximum economic and political benefits from their delivery. Thus, for example, Japan and the US may be less enthusiastic to integrate operations while small donors like Canada probably would welcome central co-ordination in planning aid and delivery of SFM-related aid. Improved coordination is likely to increase the sensitivity of programs to the priorities of the recipients if such priorities are well articulated (one would expect a higher degree of sensitivity in meeting priorities of the more sophisticated developing countries and countries in transition).

A key element in coordination which is likely to increase the sensitivity of aid to the priorities of recipients is the development of a NFAP for each recipient. The development of

NFAPs requires, however, technical assistance which would be best provided by a central international forest organization. Under the status quo governance system, only slow progress is being made in developing NFAPs for many developing countries. Resistance to the development of NFAPs may emerge from countries which lack technical resources and are unable to develop the necessary data bases and information systems. The provision of external financial support and technology transfer in such circumstances will facilitate implementation. The combination of the above measures provides critical infrastructure to ensure significant improvements in the efficiency of aid. NFAPs will reduce the uncertainty involved in private sector investment in SFM. While NFAPs may reduce some investments (those which do not contribute to sustainability and therefore do not fit within the NFAP) they may increase the contribution of other investments to SFM. A forest convention will facilitate the generation of NFAPs and international co-ordination by providing a framework for international harmonization of objectives and definitions and articulating the legally binding duties of countries with respect to managing their forests.

Measures to improve accountability are typically supported by donors and resisted by some recipients who may see such measures as infringements on their sovereignty. Measures which incorporate relevant globally agreed-to performance measures or performance measures negotiated with recipients are less likely to be resisted than measures which are highly prescriptive as to means, measures that are imposed unilaterally or measures containing conditions which reflect donor objectives that are not directly relevant to SFM. Well designed performance-based measures are likely to increase efficiency and involve low transaction costs. Complex mechanisms to increase accountability (reflecting donor administrative cultures) may meet resistance from recipients, involve high transaction costs, and contribute little to

performance. Such measures may show little sensitivity to the priorities or conditions of the recipient countries.

The development of scientifically-based guidelines or codes for SFM is likely to contribute to the promotion of SFM. Providing such codes and guidelines allows appropriate scope for incorporating the priorities of different countries and their stakeholders as well as reflecting the variety of economic, social and forest conditions. Resistance to such codes will be inversely related to their "softness". Legally binding codes are likely to be resisted by some developed countries and many developing countries who may see them as new forms of Western imperialism. The development of such codes and guidelines must be evolutionary and can be facilitated by leadership of a Council of Ministers Responsible for Forests (a smaller, more homogenous group where consensus is easier to achieve) and implementation through a centralized International Forestry Organization. The provision of a general framework and harmonization of definitions implicit in international codes or guidelines will reduce transaction costs and help achieve SFM. A convention may provide the appropriate forum (through the Conference of the Parties) for negotiating such codes. It is likely, however, that achieving consensus on legally binding international regulations will require dilution of these regulations more than if such consensus were being developed for a voluntary code.

Correcting policy failures through regulatory reform is a key to successful implementation of SFM in the South. We have already noted the need to eliminate distortionary subsidies and the political difficulties that such moves involve. Other policies that adversely affect the forests (e.g., non-sustainable industrialization policies, promotion of agriculture on cleared forest lands) also have beneficiaries who will object to any change which will reduce the benefits they accrue from the policy. Governments in the South must be encouraged to engage

in reform, but clearly any reforms should remain as their own independent initiative (few governments are likely to cede control of their regulatory processes). Encouragement of regulatory reform can be provided through financial incentives and ODA conditionality. Support of international NGOs committed to SFM may also reinforce the desired change process, but care must be taken to ensure that such support does not constitute meddling in the internal political arena of a country.

Building policy-making and implementation capacities as well as technological SFM capacities is an important pre-condition for an effective and lasting reform process. Reform processes in countries of the South may benefit from help provided by a well-endowed central forest agency capable of sharing expertise and information. Strong international leadership that can be provided by a Council of Forest Ministers may also prompt countries of the South to initiate reform processes.

Correcting market failure through regulatory reform and the use of economic instruments may reduce the future likelihood of policy failures. Competitive markets usually provide an efficient mechanism of resource allocation. They may fail, however, when externalities are present, information is incomplete, risks are high, property rights are blurred, infrastructure for their operation does not exist, or the power of some economic agents in the market allows them to influence the process.

Government, by providing the infrastructure, clarifying property rights, disseminating information, reducing risks and internalizing externalities through tax incentives or subsidies can, to an extent, correct market failures.

Since investment in SFM involves most of the characteristics that lead to market failure with resulting under investment, governments should use economic instruments as well as regulatory reforms to correct this failure.

There are several problems in using economic instruments. There are technical problems. To internalize externalities it is necessary to estimate them accurately. Thus, for example, if the benefits of sequestration are underestimated there will be less than optimal investment in afforestation. If, on the other hand, the damage of certain forest practices is overestimated the charges (fines) imposed may result in unjustified economic losses.

Politically, new taxes and changes are not very popular, while subsidies are expensive. Clarifying property rights may lead to conflict and objections from those excluded from the rights. So despite the fact that the use of economic instruments to correct market failure is desirable, it is often not the prime choice of governments.

The use of debt-related mechanisms by donor countries to finance or promote SFM in the South is limited for several reasons: (1) the increasing efficiency of global capital markets is reducing the possibility of using debt market imperfections to expand the financial resources of countries of the South with the aid of donors; (2) heavily indebted countries may not be able or willing to carry a higher loan burden; (3) the use of debt forgiveness and conditionality may have many competing claims besides SFM.

The use of ODA and grants for SFM is limited. ODA resources are shrinking while claims are increasing. SFM claims lack at present the visibility and political support to gain a substantial new share of a shrinking pie. A governance system that can increase the priority of forests in international and domestic political agendas may help secure more funds for forests.

In conclusion, it is obvious that there are many mechanisms to fund and promote SFM in the South. It is clear that the particular political, economic and forest conditions of a country will influence the effectiveness of any mechanism that is chosen. Indeed, the choice should not be one of a single mechanism, but rather of an appropriate portfolio of mechanisms. The correction of market and policy failures in the South, North and internationally are fundamental. Funds raised should be in support of and consistent with those basic strategies (indeed, they can be used to prompt and finance the more basic reforms). The effectiveness of the various mechanisms depends on the governance system underlying forest management and the political support it can generate for forest issues.

Internet Bibliography

- CIDA Forestry Advisers Network. (CFAN) 1998. "Deforestation: Tropical Forests in Decline (draft)." 31/07/98. <<http://www.rcfa-cfan.org/English/issues.12.html>>.
- CIDA Forestry Advisers Network. "CIDA and International Forestry". 08/01/98. <<http://www.rcfa-cfan.org/english/issues.1.html>>.
- Commission on Global Governance. 1991. "Chapter 1: A New World." Our Global Neighbourhood. <<http://www.cgg.ch/CHAP1.html>>.
- Commission on Sustainable Development. "The Intergovernmental Panel on Forests: its mandate and how it works." 08/01/98 <<gopher://gopher.un.org:70/00/esc/cn17/ipf/ipf-fly.txt>>.
- Commission on Sustainable Development fifth session. 1997. "International Cooperation to Accelerate Sustainable Development in Developing Countries and Related Domestic Policies." addendum on the Overall progress achieved since the United Nations Conference on Environment and Development. E/Cn.17/1997/2/Add.1. "Sources for the Financing of Development." 5 February 1997. <[http://www.un.org/esa/analysis/a\(52\)399.htm](http://www.un.org/esa/analysis/a(52)399.htm)>.
- Commission on Sustainable Development fifth session. 1996. "Chapter 33 of Agenda 21: Financial Resources and Mechanisms. addendum on the Overall Progress Achieved Since the United Nations Conference on Environment and Development. E/CN/1997/2/Add. 23.6 March 1996. <<gopher://gopher.un.org:70/00/esc/cn17/1997/off/progress/97--2a23.en>>.
- Commission on Sustainable Development fifth session. 1997. "Chapter 37 of Agenda 21: National Mechanisms and International Cooperation for Capacity-building in Developing Countries." 23 January 1997. <<gopher://gopher.un.org:70/00/esc/cn17/1997/off/progress/97--2a23.en>>.
- Commission on Sustainable Development fifth session. 1997. "Global Change and Sustainable Development: Critical Trends". 20 January 1997. <<gopher://gopher.un.org:70/00/esc/cn17/1997/off/97-3.EN>>.
- Commission on Sustainable Development Fifth session. 1997. "Report to the Ad Hoc Intergovernmental Panel on Forests on its Fourth Session". 20 March 1997. <<gopher://gopher.un.org:70/00/esc/cn17ipf/session4/97>>.
- Commission on Sustainable Development Fourth Session. 1996. "Transfer of Environmentally Sound Technologies, Cooperation and Capacity-building". 12 March 1996. <<gopher://gopher.un.org:/0/00esc/cn17/1996/off/96-13er>>.
- Commission on Sustainable Development Fifth session. 1997. "Overall Progress Achieved since the United Nations Conference on Environment and Development". 28 January 1997. <<gopher://gopher.un.org:70/00/esc/cn17/1997/off/progress/97-2a22.en>>

- IFF Secretariat. Promoting and Facilitating the Implementation of IPF's Proposals for Action. Background Document 1. Working draft. 18 June 1998.
<gopher://gopher.un.org:70/00/esc/cn17/iff/session2/bkgrnd>.
- Martin, P. Statement to the Development Committee, Washington, D.C. April 1998.
<<http://www.fin.gc.ca/newse98/98%2D045e.html>>.
- Roberts, Ralph W. and G.S. Nagle. 1997. "Leadership and Governance in World Forestry: A Discussion Paper." January 1997. <<http://www.rcfa-cfan.org/english/issues.10.html>>.
- Svensson, Jakob. 1998. "When is Foreign Aid Policy Credible? Aid Dependence and Conditionality." World Bank Working Paper. 08/01/98.
<<http://www.worldbank.org/html/prdmg/aid/jacob.htm>>.
- Technical Committee on Business Taxation. 1998. "Report in Brief." Report of the Technical Committee on Business Taxation. 6 April 1998.
<http://www.fin.gc.ca/taxstudy/brief1_e.html>.
- United Nations. Programme Element II.c of the Programme of Work of the Intergovernmental Panel on Forests. Transfer of Environmentally Sound Technologies to Support Sustainable Forest Management. Report of the Secretary-General.
<gopher://gopher.un.org:70/00/esc/cn17/iff/session2/sguic>. 14 July 1998.
- United Nations. Programme Element II.d(ii): Consider matters left pending and other issues arising from the programme elements of the IPF Process. Valuation of Forest Goods and Services; economic instruments, tax policies and land tenure; future supply and demand of wood products and non-wood forest products; and rehabilitation of forest cover.
<gopher://gopher.un.org:70/00/esc/cn17/iff/session2/nsiid2>.
- United Nations Department of Economic and Social Affairs (DESA). 1997. "Resolution Adopted by the General Assembly." for the Nineteenth special session agenda item 8. 19 September, 1997. <gopher://gopher.un.org/00/ga/recs/spec/RES-S19.2>.
- United Nations Conference on Environment and Development. 1992. "Rio Declaration on Environment and Development." 12 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/riodecl.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Annex III: Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests." 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/forestp.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 33: Financial Resources and Mechanisms." Rio de Janeiro. 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/a21_33.txt%09%09%2B>.

- United Nations Conference on Environment and Development. 1992. Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building. Rio de Janeiro. 14 August 1992. <gopher://gopher.un.org/00/conf/unced/English/a21_34.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 35: Science for Sustainable Development." Rio de Janeiro. 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/a21_35.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 36: Promoting Education, Public Awareness and Training." Rio de Janeiro. 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/a21_36.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 37: National Mechanisms and International Cooperation for Capacity-Building in Developing Countries." 14 August 1992. <gopher://gopher.un.org/00/conf/unced/English/a21_37.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 38: International Institutional Arrangements." 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/a21_38.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. "Chapter 11: Combating Deforestation". 3-14 June 1992. Rio de Janeiro.
gopher://gopher.un.org:70/0/00/conf/unced/English/a21_11tx
- United Nations Conference on Environment and Development. 1992. "Chapter 39: International Legal Instruments and Mechanisms." 14 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/a21_39.txt%09%09%2B>.
- United Nations Conference on Environment and Development. 1992. Preliminary version of the report of the United Nations Conference on Environment and Development. A/CONF.151/26 (Vol. I). Rio de Janeiro. 12 August 1992.
<gopher://gopher.un.org/00/conf/unced/English/re_voll.txt%09%09%2B>.
- United Nations Department for Policy Coordination and Sustainable Development (DPCSD). 1998. "Programme Element II. e: (ii) Consider Forest-related Work Under Existing Instruments." advance unedited text. Report of the Secretary General.
gopher://gopher.un.org:70/00/esc/cn17/iff/session2/sgiieii. 07/14/98.
- United Nations Department for Policy Coordination and Sustainable Development (DPCSD). 1998. "Programme Element II.a. of the Programme of Work of the Intergovernmental Forum on Forests Considering Matters Left Pending on the Need for Financial Resources." Note from the Secretariat. advanced unedited text.
gopher://gopher.un.org:70/00/esc/cn17/iff/session2/nsiia. 07/14/98.

- United Nations Food and Agricultural Organisation (FAO). 1998. "Transfer of Environmentally Sound Technologies to Support Sustainable Forest Management". Background Document – Information on Programme Element II.c. June 1998.
[gopher://gopher.un.org:70/00/esc/cn17/iff/session2/bckiiic](http://gopher.un.org:70/00/esc/cn17/iff/session2/bckiiic).
- United Nations General Assembly. Fifty-second session. 1997. Agenda item 95(a) Macroeconomic policy questions: financing of development, including net transfer of resources between developing and developed countries. 8 October 1997.
[http://www.un.org/esa/analysis/a\(52\)399.htm](http://www.un.org/esa/analysis/a(52)399.htm).
- United Nations General Assembly. Nineteenth special session. 1997. "Overall Review and Appraisal of the Implementation of Agenda 21". 28 April 1997.
[gopher://gopher.un.org:70/00/ga/doc/S-19/plenary/As19-11.EN](http://gopher.un.org:70/00/ga/doc/S-19/plenary/As19-11.EN)
- United Nations. Background Document 1 "Promoting and Facilitating the Implementation of IPF's Proposals for Action", 18 June 1998 Working Draft, New York.
[gopher://gopher.un.org:70/00/esc/cn17/iff/session2/gkgmd](http://gopher.un.org:70/00/esc/cn17/iff/session2/gkgmd).
- United Nations. Programme Element II.d(ii). "Valuation of Forest Goods and Services; Economic Instruments, Tax Policies and Land Tenure; Future Supply and demand of Wood Products and Non-Wood Forest Products; and Rehabilitation of Forest Cover". Note from the Secretariat. [gopher://gopher.un.org:70/00/esc/cn17/iff/session2/nsiid2](http://gopher.un.org:70/00/esc/cn17/iff/session2/nsiid2).
- United Nations. "Indicators for Economic Aspects of Sustainable Development".
[gopher://gopher.un.org:70/00/esc/cn17/1996-97/indicators/ECONOMIC.INI](http://gopher.un.org:70/00/esc/cn17/1996-97/indicators/ECONOMIC.INI).
- United Nations. Statement by Mr. Nitin Desai, Under-Secretary-General for Economic and Social Affairs, Third Ministerial Conference on the Protection of Forests in Europe. Lisbon, Portugal, 2 June 1998. [gopher://gopher.un.org:70/00/esc/cn17/iff/desai.lis](http://gopher.un.org:70/00/esc/cn17/iff/desai.lis)
- World Resources Institute. 1997. "Agenda 21, Chapter 34: Technology Transfer." 13-19 March 1997. <http://www.wri.org/wri/rio-5/rio5tech.html>.

Bibliography

- Al-Ghailani, H.H. and W.C. Moore. "Technology Transfer to Developing Countries." *International Journal of Technology Management*, Vol. 10, No. 7/8, 1995. 687-713.
- Andersen, Mikael .S. "Assessing the Effectiveness of Denmark's Waste Tax." *Environment*, Vol. 40(4). May 1998. 10-15, 38-41.
- Archibugi, Daniele and J. Michie (eds.) 1997. *Technology, Globalisation and Economic Performance*. Cambridge: Cambridge University Press.
- Baillargeon, Claude. Statement by Mr. C. Baillargeon of the Delegation of Canada. Inter-Sessional ad hoc Open-ended Working Group on Finance. Agenda 21: Financial Resources and Mechanisms. New York. 4 March 1996.
- Barthold, T.A. "Issues in the Design of Environmental Excise Taxes." *Journal of Economic Perspectives*, Vol. 8, No. 1, Winter 1994. 133-151.
- Bass, Stephen and K. Thomson. 1996. "Needs for Action on Global Forest Issues: Assessing the Potential of a Global Forest Agreement: Second Draft." World Commission on Forests and Sustainable Development. 12/09/96.
- Beardsley, Dan, T. Davies, and R. Hersh. "Improving Environmental Management: What Works What Doesn't." *Environment*, Vol. 39(7). September 1997.
- Bezdek, Roger H. "What's the Bottom Line?" *Environment*, Vol. 35(7). September 1993. 7-31.
- Bhattacharyya, Subhes C. "Energy Taxation and Environmental Externalities: A Critical Analysis." *The Journal of Energy and Development*, Vol. 22(2). 1998. 199-223.
- Bowles, Ian A. "The Global Environment Facility: New Progress on Development Bank Governance." *Environment*, Vol. 38(3). April 1996. 38-40.
- Boyd, R., K. Krutilla and W.K. Viscusi. "Energy Taxation as a Policy Instrument to Reduce CO₂ Emissions: A Net Benefit Analysis." *Journal of Environmental Economics and Management*, 29, 1995. 1-24.
- Brown, J.W. and A.J. Gabaldón. "The New World Dialogue: Promoting Sustainable Development in the Western Hemisphere." *Journal of Environmental and Development*, 1,1, Summer 1992.133-142.
- Cameron, James and K. Campbell. 1997. "Framework Agreement for the Conservation and Sustainable Management of Forests." A paper commissioned by the Environmental Investigation Agency. February 10.

- Cadot, O. and B. Sinclair-Desgagné. "Environmental Standards and Industrial Policy." *Journal of Environmental Economics and Management*, 29, 1995. 228-237.
- Carr, Thomas A., H.L. Pedersen, and S. Ramaswamy. "Rainforest Entrepreneurs: Cashing in on Conservation". In *Environment*, Vol. 35(7), September 1993. 12 - 38.
- Cashel-Cordo, Peter and S.G. Craig. "The Public Sector Impact of International Resource Transfers." *Journal of Development Economics*, Vol. 32. 1990. 17-42.
- Chakraborty, Manab. "Controversial Money Game." *The Bulletin*. January 1995. 59, 66.
- Chandrasekharan, C.(a) "Cost, Incentives and Impediments for Implementing Sustainable Forest Management". Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry, United Nations Development Programme. Pretoria, SA. June 1996.
- Chandrasekharan, C.(b) "Status of Financing for Sustainable Forestry Management Programmes". Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry, United Nations Development Programme. Pretoria, SA. June 1996.
- Chipeta, Mafa E. *Forestry Funding in Asia-Pacific, Africa, and Latin America/ Caribbean Regions: Perceptions of Main Opportunities and Constraints*. Food and Agriculture Organization of the United Nations. May 1996.
- Collier, Paul. "The Failure of Conditionality." In Catherine Gwin and Joan M. Nelson (eds.), *Perspectives on Aid and Development*, Policy Essay No. 22. USA: Overseas Development Council. 51-77.
- Commission on Sustainable Development (third session). "Programme element V. 1: International Organizations and Multilateral Institutions and Instruments." A report of the Secretary General. *International Organizations and Multilateral Institutions and Instruments, Including Appropriate Legal Mechanisms*. E/CN.17/IPF/1996/23. 20 August 1996.
- Commission on Sustainable Development (fourth session). "Contents" for Transfer of Environmentally Sound Technologies, Cooperation and Capacity-building. E/CN.17/1996/13. 12 March 1996.
- Commission on Sustainable Development (fourth session). "Financial Resources and Mechanisms." E/CN.17/1996/28. 6 March 1996.
- Commission on Sustainable Development (fifth session). "Chapter 38 of Agenda 21: International Institutional Arrangements." Addendum to Report of the Secretary-General, Overall Progress Achieved Since the United Nations Conference on Environment and Development. E/CN.17/1997/2/ Add. 28. 28 January 1997.

- Commission on Sustainable Development (fifth session). Report of the Ad Hoc Intergovernmental Panel on Forests on its Fourth Session. E/CN.17/1997/12. New York. 20 March 1997.
- Connolly, Barbara and R.O. Keohane. "Institutions for Environmental Aid: Politics Lessons and Opportunities." *Environment*, Vol. 38(5). 12-20; 39-42. June 1996.
- Crossley, Rachel A., T. Lent, D. Propper de Callejon and C. Seth. "Innovative Financing for Sustainable Forestry." Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry. United Nations Development Program, Pretoria, SA. June 1996.
- CSIS. The Environmental Protection System in Transition: Toward a More Desirable Future. Final Report of the Enterprise for the Environment. Washington, D.C.: CSIS Press. January 1998.
- Cultural and Technical Overseas Aid Agency (l'Agence de Coopération Culturelle et Technique). Financial Mechanisms for Development and the Environment. Dakar. 28 October, 1991.
- Cultural and Technical Overseas Aid Agency (l'Agence de Coopération Culturelle et Technique). Strategies and Mechanisms Which Favour Technology Transfers for Sustainable Development. Report prepared by Cogesult, Bipe conseil and Samson Bélair (Deloitte & Touche). 21 November 1991.
- Department of Finance, Canada. 1997. "Taxes as User Charges: Environmental Taxes," Report of the Technical Committee on Business Taxation. Ottawa.
- Development Assistance Committee. 1995. Private Sector Development: A Guide to Donor Support. France: OECD.
- Deweese, Peter A. "Forestry Policy and Woodfuel Markets in Malawi". *Natural Resources Forum*. Vol. 19(2). 1995. 143 - 152.
- Douglas, Jim and W. Magrath. "Financing Sustainable Forestry: The World Bank Perspective." Prepared for Financial Mechanisms and Sources of Finance for Sustainable Forestry. May 1996.
- Downing, P.B and L.J. White. "Innovation in Pollution Control." *Journal of Environmental Economics and Management*, 13, 1986. 18-29.
- Dudley, Nigel , C. Elliott, and S. Stolton. "A Framework for Environmental Labelling." *Environment*, Vol. 39(6). July/August 1997. 16-45.
- Dunkiel, Brian S. "Should Tax Policy Be Subject to NEPA (National Environmental Policy Act)?" *Environment*, Vol. 38(10). December 1996. 16-20, 30.

Environment Canada. Montreal Protocol: Business Opportunities. n.d.

Environmental Protection Agency (EPA) Journal. A Magazine on National and Global Environmental Perspectives. Vol. 19(2). April-June 1993. 9-38.

Fairman, David and Ross, M. 1996. "Old Fads, New Lessons: Learning from Economic Development Assistance." In Robert O. Keohane and M.A. Levy (eds.). *Institutions for Environmental Aid*. Cambridge: MIT Press. 29-51.

Federal Government Response to The Eighth Report of the Standing Committee on Environment and Sustainable Development. "Keeping a Promise: Towards a Sustainable Budget." Canada Communications Group: Ottawa. July 1996.

Food and Agriculture Organization (FAO) 1997. *State of the World Forests 1997*. Rome: FAO.

Food and Agriculture Organization (FAO) 1994. *Forest Resources Assessment 1990*. Rome: FAO.

Forestry Canada. "Guiding Principles: Towards a Global Consensus for the Conservation and Sustainable Development of all Types of Forests World-wide." Ottawa. July 31, 1991.

Fullerton, D. and T.C. Kinnaman. "Garbage, Recycling, and Illicit Burning or Dumping." *Journal of Environmental Economics and Management*, 29, 1995. 78-91.

Gallopín, Gilberto C. and P. Raskin. "Windows on the Future: Global Scenarios & Sustainability" *Environment*, Vol. 40(3). April 1998. 7-11, 26-31.

Geller, Howard and S. McGaraghan. 1998. "Successful Government-Industry Partnership: the US Department of Energy's Role in Advancing Energy-Efficient Technologies", *Energy Policy*, Vol. 26(3), 167-177.

Gentry, Bradford. "Making Private Investment Work for the Environment." Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile 8-10. January 1997.

Ghandi, Ved P., D. Gray and R. McMorran. "A Comprehensive Approach to Domestic Resource Mobilization for Sustainable Development." The Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.

Gillberg, Minna. "A Conceptual Approach for an International Forests Regime." The National Forest and Nature Agency: Denmark. April 1998.

Global Legislators Organisation for a Balanced Environment (GLOBE). "Model for a Convention for the Conservation and Wise Use of Forests." April 1992.

Glück, Peter, R. Tarasofsky, N. Byron, and I. Tikkanen. "Options for Strengthening the International Legal Regime for Forests." Prepared for the European Commission under the study contract B7-8110/96/000221/D4. 1997.

- Gillies, A.M. "The 'Greening' of Government Tax and Subsidy Policies: An International Overview." International Institute for Sustainable Development (IISD): Manitoba. February 1994.
- Glück, P. R. Tarasofsky, N. Byron and I. Tikkanen. 'Options for Strengthening the International Legal Regime for Forests.' A report prepared for the European commission under the study contract B7-8110/96/000221/D4, 1997. Finland: European Forest Institute.
- Golombek, Rolf and A. Raknerud. "Do Environmental Standards Harm Manufacturing Employment?" *Scandinavian Journal of Economics*, Vol. 99(1). 1997. 29-44.
- Gonzalez, Juan A.A. "Economic vs. Financial Pricing of Timber and Its Probable Impact on National Accounts: The Costa Rican Case, 1980-92. In Fraser Smith (ed.). *Environmental Sustainability: Practical Global Implications*. Florida: St. Lucie Press, 1997. 87-106.
- Gullison, R.E. and J.B. Cannon. *The Need for Experimental Management to Implement Tropical Sustainable Forestry*. United Nations Development Programme. June 1996.
- Hag, M., I. Kaul and I. Gruberg (eds.) *The Tobin Tax: Coping with Financial Volatility*. Oxford: University Press, 1996.
- Hahn, R. and G. Hester. "Where Did All the Markets Go? An Analysis of EPA's Emission Trading Programme." *Yale Journal of Regulation*, Vol. 6, No. 2, Winter, 1989. 109-153.
- Hardy, Y. "The Need for an International Convention on Forests." Statement to the Ad Hoc Intergovernmental Panel on Forests. New York: The Permanent Mission of Canada to the United Nations, February, 1997.
- Harvey, L.D. and E.J. Bush. "Joint Implementation: An Effective Strategy for Combating Global Warming?" *Environment*, Vol. 39(8). October 1997.
- Hass, Peter M. "Appraising the Earth Summit: How Should We Judge UNCED's Success?" *Environment*, Vol. 34(8). October 1992. 6-14, 34-36.
- Heindrichs, Thomas. "Innovative Financing Instruments in the Forestry and Nature Conservation Sector of Costa Rica." *Gesellschaft für Technische Zusammenarbeit*: Germany. August 1997.
- Herber, Bernard P. "Innovative Financial Mechanisms for Sustainable Development: Overcoming the Political Obstacles to International Taxation." prepared for the Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.
- Hockenstein, Jeremy B., R.N. Stavins, and B.W. Whitehead. "Crafting the Next Generation of Market-Based Environmental Tools." *Environment*, Vol. 39(4). May 1997. 13-20, 30-33.

- Hoel, M. "Environmental Policy with Endogenous Plant Locations." *Scandinavian Journal of Economics*, 99(2), 1997. 241-259.
- Holgén, Per and T. Lind. "How do Adjustments in the Forest Landscape Resulting from Environmental Demands Affect the Costs and Revenues to Forestry?" *Journal of Environmental Management*, Vol. 45, 1995. 177-187.
- Husain, Z. and Sushil. "Strategic Management of Technology - A Glimpse of Literature." *International Journal of Technology Management*, Vol. 14, No. 5, 1997. 539-575.
- Hüttl, Reinhard F. and B.U. Schneider. "Forest Ecosystem Degradation and Rehabilitation." *Ecological Engineering*, Vol. 10. 1998. 19-31.
- International Chamber of Commerce (ICC). 1991. *The Business Charter for Sustainable Development: Principles for Environmental Management*. Paris: ICC.
- International Institute for Sustainable Development (IISD). "Green Fees and Tax Cuts." for Media Release. (IISD): Manitoba. 15 February 1994.
- Jaffe, Adam B. and R.N. Stavins. 1995. "Dynamic Incentives of Environmental Regulations: The Effects of Alternative Policy Instruments on Technology Diffusion", *Journal of Environmental Economics and Management* 29, S-43-S63.
- Jun, Kwang W. and T.L. Brewer. "The Role of Foreign Private Capital Flows in Sustainable Development." The Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.
- Keen, P.B. "The Flexibility of Taxing Foreign Exchange Transactions." In Hag et al. (eds.) *The Tobin Tax: Coping with Financial Volatility*. Oxford: Oxford University Press, 1996.
- Keohane, Robert O. 1996. "Analyzing the Effectiveness of International Environmental Institutions." In Robert O. Keohane and M. A. Levy (eds.), *Institutions for Environmental Aid*. Cambridge: MIT Press. 3-27.
- Kilian, W. and J. Fanta. "Degradation of Forest Sites and Possibilities for Their Recovery." *Ecological Engineering*, Vol. 10. 1998. 1-3.
- Larson, B.A. and G.B. Frisvold. "Uncertainty Over Future Environmental Taxes." *Environmental and Resource Economics*, 8. 1996. 461-471.
- Lin, See-Yan. "Chairman's Summary." for the Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 8-10, 1997.
- Lopez, Ramon. "Demand-based Mechanisms to Finance the Green Environment in Latin America." The Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.

- MacDonald, G.J. "Technology Transfer: The Climate Change Challenge." *Journal of Environment and Development*, 1,1, Summer 1992.9-29.
- McKittrick, Ross. "Double Dividend Environmental Taxation and Canadian Carbon Emissions Control." *Canadian Public Policy - Analyse de Politiques*, Vol. XXIII(4). 1997. 417-431.
- MacNeill, Jim, J. Cox and D. Runnalls. 1989. CIDA and Sustainable Development: How Canada's Aid Policies Can Support Sustainable Development in the Third World More Effectively. Canada: The Institute for Research on Public Policy.
- Mani, Muthukumara A. "Environmental Tariffs on Polluting Imports *An Empirical Study*." *Environmental and Resource Economics*, Vol. 7. 1996. 391-411.
- Mendez, R. *International Public Finance*. New York: Oxford University Press, 1992.
- Michel, James H. Development and Co-operation. 1997 Development Assistance Committee Report. France: OECD.
- Michel, James H. Development and Co-operation. 1996 Development Assistance Committee Report. France: OECD.
- Michel, James H. Development and Co-operation. 1995 Development Assistance Committee Report. France: OECD.
- Michel, James H. Development and Co-operation. 1994 Development Assistance Committee Report. France: OECD.
- Miller, Alan S. and Curtis A. Moore. 1994. "Strengths and Limitations of Governmental Support for Environmental Technology in Japan". *Industrial and Environmental Crisis Quarterly*, Vol. 8, No. 2, 155-169.
- Morgenstern, R.D. "Environmental Taxes: Is There a Double Dividend?" *Environment*, April 1996. 16-20; 32-34.
- Muller, Frank. "Mitigating Climate Change: The Case for Energy Taxes." *Environment*, Vol. 38(2). March 1996. 13-20, 36-43.
- Nash, Jennifer and J. Ehrenfeld. "Code Green: Business Adopts Voluntary Environmental Standards." *Environment*, Vol. 39(1). January/February 1996. 16-45.
- Natural Resources Canada and Department of Finance Canada. *The Level Playing Field: The Tax Treatment of Competing Energy Investments*. Ottawa: Government of Canada. September 1996.

- Natural Resources Canada, Department of Finance Industry Canada. Federal Income Tax Treatment of Virgin and Recycled Materials (A Discussion Paper for Consultation). Ottawa: Government of Canada. December 1996.
- OECD. 1993. *Taxation and the Environment: Complementary Policies*. France: OECD.
- Olson, Molly H. "Charting a Course for Sustainability." *Environment*, Vol. 38(4). May 1996. 10-15, 30-36.
- Opoenheimer, M. "Context Connection and Opportunity in Environmental Problem Solving." *Environment*, Vol. 37, No. 5, June 1995.
- O'Riordan, Timothy (ed.) 1997. *Ecotaxation*. UK: Earthscan Publications.
- Panayotou, T. "Taking Stock of Trends in Sustainable Development Financing Since Rio." The Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.
- Panayotou, T. "Matrix of Financial Instruments and Policy Options: A New Approach to Financing Sustainable Development." Paper presented to the Second Expert Group Meeting on Financial Issues of Agenda 21, Glen Cove, New York. February 15-17, 1995.
- Parry, I.W.H. "Environmental Taxes and Quotas in the Presence of Distorting Taxes in Factor Markets." *Resource and Energy Economics*, 19, 1997. 203-220.
- Parry, I.W.H. "Pollution Taxes and Revenue Recycling." *Journal of Environmental Economics and Management*, 29, 1995. S64-S77.
- Pearce, David, E. Ozdemiroglu, and S. Dobson. "Replicating Innovative National Financing Mechanisms for Sustainable Development." The Fourth Expert Group Meeting on Financial Issues of Agenda 21. Santiago, Chile. January 1997.
- Pearce, D. "The Role of Carbon Taxes in Adjusting to Global Warming." *The Economic Journal*, 101. 1991.
- Permanent Mission of Canada to the United Nations, New York, 1996. Statement by Mr. Claude Baillargeon of the Delegation of Canada before the Commission on Sustainable Development. New York.
- Poats, Rutherford. 1991. "Applying Science and Technology to Development in the Late 1990s." In OECD, *Managing Technological Change in Less-Advanced Developing Countries*. France: OECD. 21-29.
- Poats, Rutherford. 1991. "Technological Development Opportunities in the 1990s." In OECD, *Managing Technological Change in Less-Advanced Developing Countries*. France: OECD. 57-81.

- Porter, M. "The Competitive Advantage of Nations." *Harvard Business Review*, March-April 1990. 73-93.
- Portney, Paul R. "Counting the Cost: The Growing Role of Economics in Environmental Decisionmaking." *Environment*, Vol. 40(2). March 1998.
- Ramphal, Shridath. "Beyond Mere Survival: Hope Lies in Equitable Partnerships Between Rich and Poor Countries". *Environmental Protection Agency Journal*, April-June 1993. 10-30.
- Redclift, M. "The Environment and Structural Adjustment: Lessons for Policy Interventions in the 1990s." *Journal of Environmental Management*, 44, 1995. 55-68.
- Reddy, P. "Strategic Location of R&D and Emerging Patterns of Globalization: The Case of Astra Research Centre India." *International Journal of Technology Management*, Vol. 14, Nos. 2/3/4, 1997. 344-361.
- Repetto, R., R.C. Dower and R. Gramlich. "Pollution and Energy Taxes: Their Environmental and Economic Benefits." *Challenge*, July-August 1993. 9-14.
- Report on the International Expert Consultation. Baden-Bader. 03/07/98.
- Report of the Secretary General. "Category II. Programme Element II. e: (ii)Consider forest-related work under existing instruments."
- Rowse, John. "On Ad Valorem Taxation of Nonrenewable Resource Production." *Resource and Energy Economics*, 19, 1997. 221-239.
- Russ, M. and S.M. Camp. "Strategic Alliances and Technology Transfer: An Extended Paradigm." *International Journal of Technology Management*, Vol. 14, No. 5, 1997.
- Scalera, D. "Optimal Consumption and the Environment: Choosing Between 'Clean' and 'Dirty' Goods." *Environmental and Resource Economics*, 7, 1996. 375-389.
- Schneider, K. "Involuntary Unemployment and Environmental Policy: The Double Dividend Hypothesis." *Scandinavian Journal of Economics*, 99, 1997. 45-59.
- Schöb, R. "Choosing the Right Instrument." *Environmental and Resource Economics*, 8, 1996. 399-416.
- Sedjo, Roger A. and D. Botkin. "Using Forest Plantations to Spare Natural Forests." *Environment*. December 1997.
- Shah, C. and B. Larsen. *Carbon Taxes, The Greenhouse Effect and Developing Countries*. Policy Research Paper No. 095, The World Bank, Washington, D.C.

- Sharif, M.N. "Technology Strategy in Developing Countries: Evolving from Comparative to Competitive Advantage." *International Journal of Technology Management*, Vol. 14, Nos. 2/3/4, 1997. 309-341.
- Shin, Sungwhae. "Developing Country's Perspective on COP3 Development (Kyoto Protocol)." *Energy Policy*, Vol. 26(7). 1998. 519-526.
- Shrestha, R.M. R. Shrestha and S.C. Bhattacharya. "Environmental and Electricity Planning Implications of Carbon Tax and Technological Constraints in a Developing Country." *Energy Policy*, Vol. 26, No. 7, 1998. 527-533.
- Sierra Club of Canada. "Improving the Effectiveness of Resource Transfers to the South - Learning Lessons from the Global Environment Facility". Paper prepared for Environment Canada. March 1995.
- Simula, Markku and I. Oy. "Effective Coordination Mechanisms in Financing Sustainable Forestry Development." Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry. United Nations Development Program, Pretoria, SA. 4-7. June 1996.
- Smith, Fraser. "A Synthetic Framework and a Heuristic for Integrating Multiple Perspectives on Sustainability." In Fraser Smith (ed.). *Environmental Sustainability: Practical Global Implications*. St. Lucie Press: Florida. 1997. 1-24.
- Soussan, John, P. O'Keefe, and D.E. Mercer. "Finding Local Answers to Fuelwood Problems: A Typological Approach." *Natural Resources Forum*. May 1992. 91-101.
- Southgate, D. and H. Clark. "Can Conservation Projects Save Biodiversity in South America?" *Ambio*, 1993, 22:163-66.
- Southgate, D. "Can Habitats be Protected and Local Living Standards Improved by Promoting Ecotourism, Non-Timber Extraction, Sustainable Timber Harvesting, and Genetic Prospecting." Workshop on Investing in Biodiversity Conservation, Inter-American Development Bank, Washington, D.C. October 28, 1996.
- Stavins, R.N. "Transaction Costs and Tradeable Permits." *Journal of Environmental Economics and Management*, 29, 1995. 133-148.
- Tarasofsky, Richard G. "Issues in Forest Conservation: The International Forests Regime *Legal and Policy Issues*." IUCN-The World Conservation Union. December 1995.
- Taylor, David A. "Alternative Products from Woodlands." In *Environment*, Vol. 39(1). January/February 1997. 7-36.
- Tewari, D., J.C. Nautiyal, and K. Singh. Incorporating Environmental Impacts of Afforestation in Project Appraisal: A Case Study of Western Himalayas, India". *Journal of Environmental Systems*, Vol. 19(4). 1989-90. 339-347.

- Thompson, Peter and L.A. Strohm. "Trade and Environmental Quality: A Review of the Evidence." *Journal of Environment and Development*, Vol. 5(4). December 1996. 363-388.
- Tobin, J. "A Proposal for International Monetary Reform." *Eastern Economic Journal*, Vol. 4, 1978. 153-155.
- Tornell, A. "Real vs. Financial Investment: Can Tobin Taxes Eliminate the Irreversibility Distortion?" *Journal of Development Economics*, 32, 1990. 419-444.
- Ulph, A. "Environmental Policy Instruments and Imperfectly Competitive International Trade." *Environmental and Resource Economics*, 7, 1996. 333-355.
- United Nations Center on Transnational Corporations (UNCTC). 1985. "Environmental Aspects of the Activities of Transnational Corporations: A Survey." New York: UN.
- United Nations Department for Policy Coordination and Sustainable Development. January 1995. "Financing the Transfer of Environmentally Sound Technology." prepared for the United Nations Commission on Sustainable Development.
- United Nations Commission on Sustainable Development. March 1996. "Transfer of Environmentally Sound Technologies, Cooperation and Capacity-Building". Report of the Secretary-General.
- United Nations Commission on Sustainable Development. February 1996. "Financial Resources and Mechanisms for Sustainable Development: Overview of Current Issues and Developments". Report of the of the Secretary-General.
- United Nations Commission on Sustainable Development. February 1996. "Financial Resources and Mechanisms for Sustainable Development: Overview of Current Issues and Developments". Report of the Secretary-General.
- United Nations Commission on Sustainable Development. March 1996. "Financial Resources and Mechanisms".
- United Nations Commission on Sustainable Development. August 1996. "International Organizations and Multilateral Institutions and Instruments, including Appropriate Legal Mechanisms". Report of the Secretary-General.
- United Nations Commission on Sustainable Development. January 1997. "Overall Progress Achieved Since the United Nations Conference on Environment and Development". Report of the Secretary-General.
- United Nations Commission on Sustainable Development. January 1997. "Overall Progress Achieved Since the United Nations Conference on Environment and Development". Report of the Secretary-General.

- United Nations Commission on Sustainable Development. February 1997. "Overall Progress Achieved Since the United Nations Conference on Environment and Development". Report of the Secretary-General.
- United Nations Conference on Environment and Development. August 1992. "Chapter 35: Science for Sustainable Development". (Rio de Janeiro, 3-14 June).
- United Nations Conference on Environment and Development. August 1992. "Chapter 36: Promoting Education, Public Awareness and Training". (Rio de Janeiro, 3-14 June).
- United Nations Conference on Trade and Development - Division on Transnational Corporations and Investment (UNCTAD-DTCI). 1996. World Investment Report 1996: Investment, Trade and International Policy Arrangements. New York and Geneva: United Nations.
- United Nations Department for Policy Coordination and Sustainable Development (DPCSD). 1998(c) Category II. Considering Matters Left Pending and Other Issues Arising from the Programme Elements of the IPF Process; Programme Element II.e:(i). consider Forest-Related Work of International and Regional Organizations. Department of the Secretary-General. [gopher://gopher.un.org:70/00/esc/cn17/iff/session 2](http://gopher://gopher.un.org:70/00/esc/cn17/iff/session%20). 07/14/98.
- United Nations Department for Policy Coordination and Sustainable Development (DPCSD). Programme Element I.e: (ii) Consider Forest-Related Work Under Existing Instruments. Report of the Secretary General.
- United Nations Department for Policy Coordination and Sustainable Development (DPCSD). Programme Element II.a. of the Programme of Work of the Intergovernmental Forum on Forests Considering Matters Left Pending on the Need for Financial Resources. Note from the Secretariat.
- United Nations Development Programme. Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry, Pretoria, SA. 4-7 June 1996.
- van Kooten, G. Cornelis, R.A. Sedjo and E.H. Bulte. "Chapter XX: Tropical Deforestation: Issues and Policies." In Henk Folmer and Tom Tietenberg (eds.), *The International Yearbook of Environmental and Resource Economics*, 1999/2000. Edward Elgar Publishing. Draft: 6 July 1998.
- Weimer, D. "An Earmarked Fossil Fuels Tax to Save Rain Forests." *Journal of Policy Analysis and Management*, Vol. 9, No. 2, 1996.
- World Resources Institute (WRI). World Resources 1994-1995: A Guide to the Global Environment. Washington: WRI. 1994.
- Zapata, Elssy F. A Micro Finance Approach to Forestry Financing for Poor Farmers: The Procafor Experience. Presented at the Inter Governmental Panel on Forests Workshop on Financial Mechanisms and Sources of Finance Pretoria, South Africa. 4-7 June 1996.